Report of the State Planning Commission of the
Council of People's Commissars of the
Union of Soviet Socialist Republics

SUMMARY OF THE FULFILMENT OF

THE FIRST FIVE-YEAR PLAN

FOR THE DEVELOPMENT OF THE NATIONAL ECONOMY OF THE U.S.S.R.

PUBLISHED BY THE
STATE PLANNING COMMISSION OF THE U.S.S.R.
MOSCOW · 1933

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ERRATA

Page 9, line 10 down

Reads “ collective *of* private”—should read “collective *or* private”.

Page 11, line 2 up

Reads “from *19.2* per cent to *29.0*”—should read “from *19.9* per cent to *31.0*”.

Page 12, line 12 down

Reads “*158* per cent”—should read “*157.1* per cent”.

Page 23, line 15 up

Sentence beginning “The plan for . . .” should read: “The plan for the carrying of goods has been fulfilled to the extent of *104.1* per cent and the plan for the carrying of passengers has been fulfilled to the extent of *237.6* per cent.”

Page 24, line 9 up

Reads “*32,000* kilometres”—should read “*41,000* kilometres.”

Page 28, line 3 up

Reads “to *22,180,000*”—should read “to *22,800,000*.”

Page 31, line 20 and 21 down

Figures in brackets should read: “from *39* to *50*”; “from 293 to *366*”; “from 36 to *55*”.

Page 32, line 21 down

Reads “400,000”—should read “511,000”.

Page 49, line 12 up

Reads “*35* per cent”—should read “*56.5* per cent”.

Page 50, line 7 down

Reads “*44.4* per cent”—should read “*44.2* per cent”.

Page 60, line 6 down

Reads “*15.4* times”—should read “*18.3* times.”

Page 103, line 3 down
Reads "new *pits* will amount"—should read "new *pits and pits in construction* will amount".

Page 132, line 16 up
Reads "from 1.78 *million* in 1927-28 to 4.8 *million* in 1932"—should read "1.78 *billion* . . . to 4.8 *billion*".

Page 139, line 13 down
Reads "increased *8.7 times*"—should read "increased *8.3* times".

Page 186, table, line 2 down of figures
Reads "*6,411.1*"—should read "*6,311.1*".

Page 193, line 3 down (line under table)
Reads "*almost* doubled"—should read "*more than* doubled".

Page 219, line 21 down
Reads "*72.8*"—should read "*72.0*".

Page 222, line 16 down
Reads "by *1,654* million rubles, of which *813* million rubles came from the rural population and *841* million rubles"—should read "by *700* million rubles, of which *340* million rubles came from the rural population and *360* million rubles".

Page 223, line 16 down
Reads "*66.0* per cent"—should read *66.8* per cent".

Page 231, Sixth Column of table, line 3 down
Reads "*905.0*"—should read "*903.3*".

Page 286, appendix 2nd column in figures
Reads "*6,411.1*"—should be read "*6,311.1*".

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Russia. Sovet truda i oborony. Gosudarstvennaia obshcheplanovaia Komissiia.

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PREFACE

THE object of the present work compiled by the State Planning Commission of the Council of People's Commissars of the Union of Soviet Socialist Republics and by the Central Board of National Economic Accounting of the State Planning Commission of the U.S.S.R. is to provide factual and statistical material on all aspects of the plan showing the fulfilment of the first Five-Year Plan (1928-29 to 1932-33) in the course of four and a quarter years (1928-29 to 1932) and in those parts in which 1928 is compared with 1932, in four years. The fulfilment of the plan is shown on the basis of the data of the Central Board of National Economic Accounting of the State Planning Commission of the U.S.S.R. and of the respective People's Commissariats.

This data was verified and compiled by the State Planning Commision of the Council of People's Commissars of the U.S.S.R in conjunction with the Central Board of National Economic Accounting of the State Planning Commission of the U.S.S.R. The statistical material given in this work includes more complete data than the State Planning Commission of the Council of People's Commissars of the U.S.S.R. was able to present to the Government of the U.S.S.R. on January 1, 1933, and for that reason, certain figures of industrial output and of capital investment differ from those previously published and represent more precise data. Owing to the immensity of the territory of the U.S.S.R. and the gigantic sweep of construction, we cannot in this work confine ourselves exclusively to the final data available, hence, the figures showing the results achieved in 1932 may still undergo slight revision.

The present work was edited by a committee, appointed by the

Presidium of the State Planning Commission of the U.S.S.R., consisting of V. I. Mezhlauk, V.V. Ossinsky, R. I. Gaister, I. A. Kraval, G. I. Smirnov, B. V. Troitsky. B. S. Borilin, V. V. Belenko and A. I. Kristin.

V. V. KUIBYSHEV
Chairman of the State Planning Commission of
the Council of People's Commissars of the
Union of Soviet Socialist Republics

SUMMARY OF THE FULFILMENT OF THE FIRST FIVE-YEAR PLAN FOR THE DEVELOPMENT OF THE NATIONAL ECONOMY OF THE U.S.S.R.

GENERAL SUMMARY

I

THE dictatorship of the proletariat, the nationalization of the factories, the land, transport and the credit system, the socialist bond between town and countryside, the monopoly of foreign trade—all these made possible, necessary and obligatory the planned guidance of the economic development of the U.S.S.R.

Owing to the contradiction that exists between the social character of production and private capitalist appropriation, the characteristic feature of capitalism in all stages of its development has been anarchy and competition which became particularly acute in the period of imperialism. The characteristic feature of Soviet economy at all stages of its development is the plan, and moreover, the plan that is a directive, a set task, and not a mere forecast. The concentration of the economic key positions in the hands of the proletarian State ensures to them the leading and socialistically transforming role in the development of the whole economy of the country. Thanks to this, at all stages of its development the plan of national economy stands forth as the plan for the building up of socialism.

With the growth and consolidation of the proletarian dictatorship, the planned guidance of the whole economy of the country also grew and became consolidated. Economic plans more and more widely and deeply covered national economy, and their degree of concreteness and operativeness increased. A striking index of the increase of the role of the plan was the transition from the State Plan for the Electrification of Russia *(Goelro)* and the annual control figures to the Five-Year Plan of national economy.

The necessity for this transition arose in connection with the completion of the restoration period of the economy of the Soviet Union and with the advancement, as the main task of socialist construction, of the task of the creation of a domestic base for the reconstruction of national economy, of the consolidation and expansion of the socialist forms of economy in agriculture. The solution of these important political and economic problems could not be given within the limits of annual plans, and this created the necessity of drawing up a Five-Year Plan. The possibility of carrying this out was ensured in its turn by the fact that in the transition from the restoration period to the reconstruction period, socialist industry and other key positions of socialism to an enormous degree increased and strengthened their leading role in the whole of the economy of the country.

The first Five-Year Plan, which was endorsed by the Sixteenth Conference of the Communist Party of the Soviet Union and by the Fifth Congress of the Soviets in 1929, provided for such changes in the economy and in the relationships between classes as ensured the consolidation of the positions of socialism in the U.S.S.R. and the laying down of the foundation of socialist economy. It is precisely for this reason that a fierce class struggle raged around the first Five-Year Plan even in the period when it was being drawn up.

The Right opportunists, while in words admitting the planned character of economy in the U.S.S.R., actually denied it in so far as they refused to admit that industrialization was the decisive lever for the reconstruction of national economy; they fought against high rates of industrialization; they denied the decisive significance of the link between the working class and the peasantry on the basis of production;* to the class struggle for the

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* From the introduction of the New Economic Policy in 1921 to the beginning of the Five-Year Plan period the principal form of intercourse between town and country was the link *(smychka) based on trade,* when in exchange for agricultural produce the industries supplied the peasants with goods mainly for the satisfaction of their personal needs (cloth, boots, kerosene, sugar, etc.), and when this alliance developed by increasing the interchange of commodities between industry and agriculture and the expansion of co-operative trade.

At the beginning of the Five-Year Plan period the main form of intercourse between town and country became the *link based on production,* which means that, in addition to increasing the interchange of agricultural produce for the articles of personal consumption produced by the urban industries, the working class directs its efforts in production towards serving the production requirements of the countryside (agricultural machinery, tractors, improved seeds, fertilizers, etc.), which are the fundamental things required for the reconstruction of agriculture on a new technical basis.

The most important new forms of the link are: the organization and improvement of the work of State farms, the organization of new and the de-realization of the Plan of the socialist reorganization of the whole of national economy they counterposed the theory that the *kulaks* would peacefully grow into socialism, the theory that things should be allowed to go automatically their own way. Taking this as their starting point, the Right opportunists, in opposition to the Five-Year Plan of development of national economy proposed a two-year plan, in which the central link in the development of national economy was not industry, but agriculture, not the socialist transformation of the countryside, but the consolidation of private, peasant economy. This, in fact, implied the denial of the possibility of building socialism in a single country, the denial of the possibility of drawing the main masses of the peasantry into socialist construction. The realization of the "two-year plan" would have led to the perpetuation of the technical backwardness and agrarian character of the country, to bourgeois restoration and to the colonial subjugation of the U.S.S.R. to the capitalist world. A. I. Rykov, the leader of the Right opposition, admitted in 1933 that "had the Party proceeded along the path that I proposed at one time, then, at the present time—the private, property-owning capitalist strata in our country would have been strengthened. In the final analysis, the strengthening of the property-owning elements in the land of the dictatorship of the proletariat must lead to bourgeois restoration."

The Trotskyists, in their turn, denied the possibility of the planned development of the economy of the U.S.S.R. in that they denied the law of uneven development of capitalism, and asserted that the international division of labour stands higher than the dictatorship of the proletariat in a single country and imperatively dictates to it its further development. They denied that the dictatorship of the proletariat was a special form of the link between the working class and the peasantry and prophesied the inevitable rupture between the working class and the peasantry. They denied the leading and determining role and also in the subsequent course the decisive significance of socialist industry. The Trotskyists advanced the bourgeois theory that the building up of socialism in a single country and the reconstruction of the national economy of

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velopment of existing collective farms, the organization of a wide network of machine and tractor stations, carrying out measures for improving the yield of the harvest, etc.

the U.S.S.R. by its own efforts were impossible. All the suggestions for a plan made by the Trotskyists represented a number of strategical manoeuvres which, in words, appeared to advocate super-industrialization, but which in fact meant capitulation, and which, if carried out, would inevitably have led to the failure of the socialist reconstruction of the whole of the national economy of the country, to bourgeois restoration and to the downfall of the proletarian State.

In addition to the struggle against the Plan for the socialist reconstruction of the national economy of the U.S.S.R. waged by the agents of the bourgeoisie within the Communist Party, namely, the Right opportunists, and Trotskyists, the bourgeoisie directly waged a struggle against the socialist Plan through the medium of wrecking organizations. The wreckers tried to turn the Plan to their own ends in order to divert the economic development of the Soviet Union onto lines that would create disproportion between the various branches of national economy, onto lines that would lead to famine and crisis, and by that create the conditions for imperialist intervention and bourgeois restoration.

The Five-Year Plan was born in the midst of a fierce class struggle around the question of the main roads and means of socialist construction. Notwithstanding the counter-revolutionary resistance of the Rights and the Trotskyists, the Communist Party and the Soviet Government adopted the Five-Year Plan for the socialist reconstruction of national economy. More than that, of the two variants of the plan—the initial plan and the optimal plan, that were submitted by the State Planning Commission, the Sixteenth Party Conference of the Communist Party of the Soviet Union and the Fifth Congress of Soviets adopted the optimal variant of the plan, which, in the subsequent course of its fulfilment. became a minimum plan, for the scope of its main tasks was considerably widened.

The successes achieved in the industrialization of the country. the great achievements in the organization of advanced collective farms and State farms—models of socialist agriculture—and the fundamental turn of the middle peasant to the path of socialism made it possible, and the further development of the socialist industrialization of the country in the very first year of its fulfilment made it necessary that the Five-Year Plan be supplemented by the historical task of introducing the mass collectivization of farming and, on that basis, the liquidation of the *kulaks* as a class.

The considerable overfulfilment of all the indices of the Five-Year Plan in the very first years, the tremendous enthusiasm of the toilers that was aroused by the Five-Year Plan, the enormous successes achieved in the creation of a new, socialist, labour discipline, permitted the setting of the task of reducing the period of fulfilment of the Five-Year Plan to four years.

Thanks to the successful progress of the socialist reconstruction of the country and the development of industry, and to the fact that Soviet industry achieved considerable successes in mastering the advanced technique of capitalism, the possibility was also created for supplementing the Five-Year Plan by the further expansion of the scale of reconstruction of national economy. This found expression in the plan for the creation of a second coal and metallurgical base in the East, the construction of a number of industrial giants that were not included in the original Five-Year Plan (the Kharkov Tractor Works, the Saratov Combine Harvester Works, the Gorky* Turret Lathe Works, the Milling Machine-Tool Works in Moscow, the Moscow Watch factory, the Azovstal and New Tula Steel Works, the Nikopol and Pervo-Uralsk Tube-rolling Works, the Sinarsk, Lipetsk and Makeyevka Cast-Iron Pipe Works, the Synthetic Rubber Works, the opening up of the Karaganda coal district, etc.), the organization of new industries not provided for in the original Five-Year Plan (the manufacture of combine harvesters, caterpillar tractors, cotton pickers and similar machines for other crops, 50,000 kw. turbines, electric cars, powerful locomotives, blooming mills and complex equipment for the iron and steel industry, rotary printing presses and linotypes, complex optical and measuring instruments, powerful radio transmitters, super-hard alloys, etc.), and the solution on an industrial scale of the most complicated technical problems (the production of vanadium from Kerch and Ural ores, ferro-alloys, various types of special steel, the solution of the problem of selective flotations from poly-metallic ores, the production of aluminium and synthetic rubber, the utilization of inferior types of fuel, the extensive electrification and large application of chemistry to production processes, etc.).

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* Formerly Nizhni-Novgorod.

All these supplements to the Plan—the enlargement of the scale of reconstruction and the fulfilment of the Five-Year Plan in four years, the mass collectivization of agriculture and the liquidation of the *kulaks* as a class, were introduced on the initiative of Joseph V. Stalin, who systematically and persistently guided the work of the Party in fulfilling and overfulfilling the Five-Year Plan, and who brilliantly foresaw the path and possibility of overfulfilling the Five-Year Plan in its most decisive and fundamental links.

II

In the opinion of the State Planning Commission, the fulfilment in five years of the optimal variant of the Five-Year Plan, adopted by the Communist Party and the Soviet Government, required especially favourable conditions which, if lacking, would drag out the fulfilment of the program for six years.*

In the process of fulfilling the Five-Year Plan, however, not only were these favourable conditions lacking, but in a number of cases, conditions were less favourable than were anticipated even in the initial variant of the Five-Year Plan.

The Five-Year Plan was based on the assumption that there would not be any serious failure of the harvest in the course of the five years. As a matter of fact, in 1931, the gross yield of grain in the principal eastern grain regions, as a consequence of the exceptionally unfavourable meteorological conditions in these regions in that year, was 107 million centners lower than the average yield for the period 1927-30.

The Five-Year Plan was also based on the assumption that there would be a considerable expansion in the economic intercourse between the U.S.S.R. and world capitalist economy. But the world crisis which broke out in the capitalist countries in 1929 led to a sharp reduction in world trade, to the shrinking of credits, to the intensification of tariff wars which are taking the form of numerous import restrictions, the direct prohibition of imports of certain classes of goods, the extensive introduction of quotas, etc. According to the returns of the Statistical Board of Germany, the trade of the capitalist world (ninety countries) in the period 1928 to 1932 declined by 61.2 per cent.*

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* In its report the State Planning Commission stated: "On the other hand, the optimal variant is based on the assumption: a) that there will be no serious failure of the harvest in the course of the five years; b) that a considerably wider expansion of economic intercourse will be obtained with world economy, both as a result of the considerable available export resources of the country (the complete realization of the decree of the Central Executive Committee on raising the yield of the harvest) as well and particularly as a result of a considerably more rapid increase in foreign long-term credits in the very first years of the Five-Year Plan; c) that a sharp improvement will take place in the qualitative indices of national economic construction within the next two years (cost of production, yield of harvest, etc.) and that d) there will be a diminution in the proportion of expenditure on national defence in the general economic system." *(The Five-Year Plan,* Vol. 1, third edition, p.11.)

Notwithstanding the Trotskyist theory that the economy of the U.S.S.R. is subject to the laws of world capitalist economy and that the world capitalist crisis must inevitably spread to the U.S.S.R., the Soviet Union, thanks to the socialist nature of its economy, not only achieved an uninterrupted increase in production, but also overcame the additional difficulties connected with foreign trade and caused by the increasingly profound crisis of world capitalist economy.

While the foreign trade of capitalist countries declined, the U.S.S.R.'s share of world trade increased, and the U.S.S.R. moved up from the seventeenth place, which it occupied in 1928, to eleventh place in 1932.**

Nevertheless, the general decline in world trade and the creation of particularly unfavourable conditions for the foreign trade operations of the U.S.S.R. in a number of countries (the annulment of the Trade Agreement and rupture of relations with England in 1927-28, the increase of prohibitive measures against Soviet imports in the U.S.A. in 1930 and in 1931, the slanderous campaign about alleged "forced labour", etc.), led to the under-fulfilment of the export and import plan.

Another unfavourable factor affecting the foreign trade of the U.S.S.R. operated in the same direction—the sharp drop of prices on the world market. In 1932, the index number of wholesale prices dropped to 67.2 in the U.S.A., 68.9 in Germany and 52.1 in England (taking 1928 as 100).*** Moreover, it must be noted that the drop in prices in the world capitalist market was sharper for agricultural produce and industrial raw materials (the main items of export of the U.S.S.R.) than for finished manufactured goods (the main items of import of the U.S.S.R.). For example, in 1932, the index number of wholesale prices for agricultural produce in the U.S.A. dropped to 45.5, whereas the index number of wholesale prices for manufactured goods dropped to 75.6 (1928 as 100).*

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* *Wirtschaft und Statistik,* No. 7, 1933.

** *Vierteljahrshefte, Institut für Konjunkturforschung*—Berlin, No. 4, 1932.

*** *Bulletin Mensuel de Statistique,* February, 1933.

In view of the fact that the volume of U.S.S.R. export and import operations was smaller than that anticipated in the Five-Year Plan, the fulfilment of the plan of industrialization called for the revision of the import plan in the direction of securing the imports of machinery primarily for the purpose of equipping the industrial enterprises, and of supplying agriculture with modern means of production and in the direction of reducing the imports of raw materials for the light industry. Imports of metals and machinery for the four years exceeded the plan for these four years by 5.7 per cent, the imports of industrial equipment exceeded the plan by 7.8 per cent, and the imports of raw materials for the heavy industry exceeded the plan by 26.2 per cent.

The change in the structure of the import plan, in addition to the enormous progress made in home production of machinery and in other branches of the heavy industry in the U.S.S.R., permitted the creation of the necessary prerequisites for the successful fulfilment of the Five-Year Plan, notwithstanding the unfavourable conditions of foreign trade.

The optimal variant of the Five-Year Plan was based on the assumption that the proportion of expenditure on national defence to the total expenditure on national economy would be lower than that provided for in the initial variant of the plan. In the process of fulfilling the Five-Year Plan, however, in view of the growing danger of war, the U.S.S.R. was obliged to increase its defence program (in the last year of the Five-Year Plan) for the purpose of improving the defence capacity of the country.

Thus, not only were the favourable conditions, which according to the Five-Year Plan were to guarantee the fulfilment of the optimal variant of the plan in five years, lacking, but additional difficulties arose.

Nevertheless, the plan was fulfilled and, moreover, in a period of time that simply stunned the enemies of the U.S.S.R. We have every reason to assert that the tasks of the first Five-Year Plan, which the State Planning Commission in view of the above-mentioned unfavourable conditions calculated would take not less than six years to carry out, were carried out in four years (to be more precise, in four and a quarter years).

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* *Survey of Current Business*, U.S.A., February 1933.

The active participation of the toilers in the work of socialist construction and the winning of additional millions of men and women for this work, the strengthening of socialist labour discipline, the important successes achieved in solving the problem of cadres, the solution of the question, "who will win"—whether collective of private enterprise—in industry and in agriculture, and the increasingly growing advantages of the socialist system in proportion as socialism grew in the U.S.S.R.—all this determined the world historical victory of the working class in the development of the socialist economy of the Soviet Union and the fulfilment of the Five-Year Plan in four years.

III

The Fifth Congress of Soviets declared that: "The Five-Year Plan submitted by the Government, being an extended program of the socialist reconstruction of national economy, conforms to the general course pursued by the Soviet Government towards the industrialization of the Union of Soviet Socialist Republics, towards the socialist reconstruction of the countryside, the overcoming of the capitalist elements and the consistent strengthening of the socialist elements in the economic system of the country, and towards increasing the defence capacity of the Union of Soviet Socialist Republics."

At the beginning of the Five-Year Plan period, the U.S.S.R. was an agrarian country with a backward and partly mediaeval technique, with an industry whose level of development was far from being adequate for the purpose of reorganizing industry, transport and agriculture on the basis of modern technique.

The beginning of the Five-Year Plan period marked the close of the restoration period in the U.S.S.R., and the country had only taken the first steps in the direction of reconstruction. In regard to the level of technique, the country was not far removed from that of pre-revolutionary Russia, concerning which Lenin said that it was a country that was "equipped with modern implements of production one-fourth that of England, one fifth that of Germany and one tenth that of America."*

The agrarian character of the country was expressed in the high proportion of agriculture in the national income, which in 1927-28 equalled 44.1 per cent, whereas the proportion of the census industry** was equal to 27.6 per cent. In 1928, the share of planned industry*** in the combined gross output of agriculture and planned industry was 48 per cent. The agrarian character of the country was strikingly reflected in the proportion of the urban population to the rural population. In 1928 the urban population represented 17.9 per cent of the total population. The number of industrial workers and employees was 142 per 1,000 persons of working age.

The necessity to remove the technical and economic backwardness of the U.S.S.R. called for the fulfilment of an enormous program of construction in the first Five-Year Plan. The construction program was the pivot of the first Five-Year Plan. During the four and a quarter years of the operation of the Plan, the volume of capital investments in the socialized sector of national economy*** amounted to 52.5 billion rubles, thus exceeding the Plan, which was calculated for five years, by 11.9 per cent.

This wide sweep of construction was achieved exclusively by the mobilization of the internal resources of the country. Relying on the output capacity of the old enterprises that had been restored by the time the first Five-Year Plan commenced, and by enlarging these enterprises the U.S.S.R. managed in a short historical period of time, and on a scale unprecedented in capitalist countries, to construct new enterprises that are a model of modern technique.

The volume of capital investments in industrial construction in the four and a quarter years amounted to 24.8 billion rubles, as against 19.1 billion rubles provided for in the Five-Year Plan. During the same period, 21.3 billion rubles were invested in the heavy industry, as against 14.7 billion rubles provided for in the Five-Year Plan. Fifty per cent of the total capital investments in industry were invested in the construction of new enterprises equipped with modern technique.

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* *Collected Works*, Vol. XVI, p. 543, Russian 3rd edition.

** *Census industry* comprises industrial enterprises employing not less than sixteen workers where there is mechanical driving power, and not less than thirty workers where there is no mechanical driving power.

*** *Planned industry* includes all plants and factories controlled by the four People's Commisariats—People's Commissariat of Heavy Industry, People's Commissariat of Light Industry, People's Commissariat of Timber and Peoples Commissariat of Supply.

*** The *socialized sector* embraces the State and Co-operative enterprises.

As a result of the construction carried out, the fixed capital of the socialized sector of national economy more than doubled in the Five-Year Plan period. The technical level of this new fixed capital far exceeds that of the fixed capital of the U.S.S.R. at the beginning of the Five-Year Plan period. This testifies to the gigantic growth of the productive forces of the country and to the profound technical revolution that has taken place, which is one of the most brilliant victories of the Five-Year Plan.

The gross output of industrial production increased from 15.7 billion rubles in 1928 to 34.3 billion rubles in 1932 (calculated at prices prevailing in 1926-27), which represents 218.5 per cent of 1928. The volume of industrial production in 1932 exceeded the pre-war level more than three-fold, and exceeded the level of 1928 more than two-fold. The first Five-Year Plan as a whole was fulfilled to the extent of 93.7 per cent as far as the gross output of industry is concerned.

The share of census industry in the national income increased from 27.6 per cent in 1927-28, to 38.4 per cent in 1932. The share of industry in the gross combined output of planned industry and agriculture (the latter having greatly increased) rose from 48 per cent in 1927-28 to 70 per cent in 1932. In structure of national economy the U.S.S.R. has reached the level of the advanced capitalist countries. In Germany, the share of industry (without building) in the gross combined output of industry (without building) and agriculture in 1931-32 was 80.3 per cent, and in the United States in 1929, 82.6 per cent.*

The rapid development of industry caused a considerable increase in the proportion of the urban population to the total population towards the end of the Five-Year Plan period, particularly in the proportion of the proletarian population. The proportion of the urban population increased from 17.9 per cent in 1928, to 23.3 per cent in 1932, while the proportion of the proletarian population (both urban and rural) increased from 19.2 per cent to 29.0 per cent in the same period. The number of workers and employees in 1932 rose to 257 per 1,000 of the population of working age, as against 142 per 1,000 at the beginning of the Five-Year Plan period.

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* Figures for Germany taken from *Konjunkturstatistisches Handbuch* for 1933 and for the United States from the *Statistical Abstract of the U.S.A.*, 1932.

The growth of industrialization also found expression in the increase in the share of the output of means of production. At the beginning of the Five-Year Plan period, the share of output of means of production represented 44.3 per cent of the total output of the census industry (in 1928), and the output of articles of consumption represented 55.7 per cent.

In the last year of the Five-Year Plan the value of the output of means of production rose to 18 billion rubles as against 6.96 billion rubles in 1928, *i.e.*, an increase of 158 per cent; the value of the output of articles of consumption rose from 8.7 billion rubles to 16.3 billion rubles, *i.e.*, by 87.3 per cent.

The U.S.S.R. has become a land of heavy industry. The varying rates of growth in the main branches of industry resulted in the share of heavy industry rising from 44.3 per cent in 1928, to 52.5 per cent in 1932. The Soviet Union is already on a level with such countries as England and Germany in the structure of its industry. The share of the output of the means of production in the total output of industry in Germany in 1925 was equal to 54.5 per cent and in 1931 it was equal to 45.2 per cent; in England in 1924 it was equal to 54 per cent.*

As a result, the U.S.S.R. has been transformed from an agrarian country into an industrial country. The socialist form of industry has become the sole form of industry in the U.S.S.R.

During the Five-Year Plan period the U.S.S.R. created a heavy industry that is capable of completing the re-equipment and reorganization of industry, transport and agriculture.

Before the war, only 36.2 per cent of the total value of the equipment employed in national economy was produced in Russia. In 1927-28, however, even when the construction program was only just beginning to be carried out, imports of industrial machines represented 32.5 per cent. For certain complex types of machines, however, the figures were considerably higher, for example; steam turbines 52.6 per cent, metal working machinery 67.1 per cent, textile machinery 27.7 per cent, and tractors 69 per cent.

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* Figures for Germany taken from the *Vierteljahrshefte; No. 3, Teil A, Institut für Konjunkturforschung,* Berlin, 1931. Figures for England taken from the *Third Census of Production,* 1929 edition.

The backwardness of the machine building industry in the U.S.S.R. at the beginning of the Five-Year Plan period made it necessary to import the greater part of modern machinery required, as it was impossible to produce these at home.

That was the position at the beginning of the Five-Year Plan period. In the course of the four years of the Five-Year Plan period, the main branches of industry in the U.S.S.R. were provided with modern machinery, and the Soviet Union took its place in the ranks of the advanced industrial countries.

The Five-Year Plan for machine construction in the last year of the Plan period was exceeded by 57 per cent. The output of general engineering rose from 1,405,800,000 rubles in 1928 to 5,252,900,000 rubles in 1932 and thus exceeded the plan by 81.2 per cent. The output of the agricultural machine building industry (including tractors) rose from 176,900,000 rubles to 890,400,000 rubles in the same period.

Compared with pre-war times, the output of the machine building industry in 1932 increased ten-fold, and compared with that of 1927-28 it increased 4.4 times.

During the Five-Year Plan period, the manufacture of tractors was developed at the Red Putilov Works, the Stalingrad Tractor Works and the Kharkov Tractor Works, while the Chelyabinsk Tractor Works is about to be started. In 1932 alone, the output of tractors reached 50,000, almost double the number of tractors that were in use in agriculture in 1928, *i.e.*, 26,700. At the same time the production of complex tractor parts and harvester combines has been mastered. In 1932, 10,000 combines were manufactured.

During the Five-Year Plan period, a new aeroplane and aeroplane motor industry has been created, which is one of the greatest achievements of the first Five-Year Plan.

The production of automobiles on the basis of the latest achievements of world technique has been developed at the Moscow, Gorky and Yaroslavl automobile works.

Having become the basis for the technical re-equipment of national economy, the machine building industry has at the same time mastered the construction of machines necessary for making machines. During the first Five-Year Plan period, the manufacture of machine-tools was developed; gigantic plants like the Moscow and Gorky machine-tool plants have been put into operation.

The Soviet machine building industry is now in a position to design and manufacture any type of machine, and spare parts for any type of imported equipment. Equipment that was formerly an important item of imports is now being manufactured at home. The U.S.S.R. is now able to satisfy its own requirements in locomotives, electric cars, automobiles, tractors, agricultural machinery, blast furnace equipment, motors, powerful blooming-mills, turbines, electric furnaces, measuring instruments, automatic signalling apparatus and a number of other types of machines and apparatus which hitherto have been important items of manufactured imports.

The most important directive of the Communist Party—"to transform the U.S.S.R. from a country importing machinery and equipment into a country that manufactures machinery and equipment" (Resolution of the Fourteenth Congress of the C.P.S.U.), has been carried out.

The solution of the problem of creating a machine building industry in the Soviet Union was one of the most important links in the fulfilment of the Five-Year Plan, and this guarantees the technical reconstruction of the whole of national economy, the reorganization of the whole of the national economy of the Soviet Union on the basis of modern machine industry in the course of fulfilling the second Five-Year Plan.

As a result of the first Five-Year Plan, the U.S.S.R. has strengthened its technical and economic independence of the capitalist world, having occupied second place in the world's output of machinery in 1931.

In 1928, the output of the Soviet machine building industry represented 4.2 per cent of the output of the machine building industry of capitalist countries. In 1931, the output of the Soviet machine building industry represented 26.6 per cent of the output of the capitalist countries. In 1928, the output of machines in the Soviet Union equalled 7 per cent of that of the United States, 29.2 per cent of that of Germany and 37 per cent of that of England. In 1931, the output of Soviet machine building industry rose to 56.9 per cent of the actual output of the machine building industry of the United States, 140 per cent of that of England and 151.1 per cent of that of Germany.*

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* *Wochenberichte, Institut für Konjunkturforschung,* Berlin, August, 1932.

During the Five-Year Plan Period, a base was created of the heavy industry—a powerful iron and steel industry. The old enterprises were radically reconstructed and a new metallurgical base, the Ural-Kuznetsk base was created. The Magnitogorsk and Kuznetsk metallurgical combines represent an important step towards the more even geographic distribution of the Soviet industry and towards guaranteeing the power of defence of the U.S.S.R.

The fixed capital in the iron and steel industry at the end of the Five-Year Plan period had increased two-fold compared with 1928.

A powerful electro-steel industry has been created. The output of special rolled steel increased from 70,000 tons to 555,000 tons, *i.e.*, an eight-fold increase. The U.S.S.R. can now manufacture automobiles and tractors, means of defence, turbines and tools from its own metals.

Blast furnaces with a capacity of 1,000 tons per day and blooming mills with a capacity of 1 million tons of blooms per annum have been built, and the average size of metallurgical works has increased 60 per cent.

The U.S.S.R. has achieved important successes in one of the most important sections of the technical reconstruction of national economy—electrification. The power of all electric power stations rose from 1,874,000 kilowatts in 1928 to 4,567,000 kilowatts in 1932. Starting with the small and tiny stations that existed in tsarist Russia, the U.S.S.R., after building the Volkhov Hydro-electric Power Station, managed to build a giant like the Dnieper Hydro-electric Power Station. In 1928 there were eighteen district power stations in operation in the U.S.S.R. with a total power of 610,000 kilowatts. At the end of 1932, there were already forty-three district power stations with a total power of 2,624,000 kilowatts. At the end of the first Five-Year Plan period, there were in the U.S.S.R. ten electric power stations each of 100,000 kilowatt capacity and over. At the same time, higher coefficients of effective utilization of the equipment in electrical power stations are being attained. In the U.S.S.R. the coefficient of effective use is 3,570 hours (1932) as against 3,000 hours in the United States (1929), 1,800 hours for central electric power stations and 2,200 hours for electric power stations belonging to enterprises in Germany (1931) and 1,700 hours in England (1928).*

In the U.S.S.R., a number of electric grid systems has been established with a tension of 100,000 volts. The Dnieper grid has a voltage of 160,000; Leningrad is united with the Svirsk Hydroelectric Power Station with a tension of 220,000 volts. In degree of electrification of industry we have already surpassed England, and we are closely approaching the position of the most advanced capitalist countries. Thus the coefficient of electrification of industry in the U.S.S.R. in 1932 was equal to 71.2 per cent, in England 49 per cent (1929), in Germany 64.6 per cent (1925) and in the United States 78.3 per cent (1929).**

The production of electric power in the U.S.S.R. compared with 1913 increased 6.7 times, and compared with 1928—2.6 times.

During the Five-Year Plan period, a new modern technically advanced chemical industry has been built up. The output of the chemical industry in group "A" (not including the rubber industry) rose from 319.3 million rubles in 1927-28 to 1,039.9 million rubles in 1932.

The inadequate development of the heavy industry at the beginning of the Five-Year Plan period, in its turn, determined the low technical level of the whole of industry, transport and agriculture. At the beginning of the Five-Year Plan period, 85 per cent of the coal obtained in the U.S.S.R. was mined by manual labour; in the metallurgical industry the main processes of production, such as the charging of blast furnaces, the charging of open hearth steel furnaces and the pouring of molten metal were mechanized only to an insignificant degree. Lumbering and the production of the simplest building materials were almost entirely carried on by manual labour without mechanization, nor was the extraction of peat sufficiently mechanized.

Manual labour predominated also in a number of branches of the light industry (clothing, boots and shoes, etc.), and to a considerable degree in the food industry.

The technique of agriculture was on a particularly low level: 45 per cent of the grain crops was reaped with scythe and sickle,

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* *Die Energiewirtschaft der Welt. Sonderheft. Institut für Konjunkturforschung*, No. 19, and *Wirtschaft und Statistik*, No. 14 1933.

** According to the returns of censuses of production of the respective countries.

70 per cent of the sowing was done by hand and not less than 40 per cent of the harvest was threshed with flails and other hand implements. Nor was loading and unloading on railway and water transport mechanized.

The introduction of modern technique and electrification in the national economy of the U.S.S.R. secured the decisive transition from manual labour, which prevailed to an enormous degree, to the extensive electrification and mechanization of the main processes of production in all branches of national economy. The percentage of electrification of industry rose from 50.9 in 1928 to 71.2 in 1932. Already in 1930, the amount of horse power available per worker in the U.S.S.R. was 2.8, whereas in England it was equal to 2.46 (1924) and in Germany 2.8 (1925).*

Towards the end of 1932, coal mining in the U.S.S.R. was mechanized to the extent of 63.6 per cent, and in the Donbas coal field to the extent of 71.9 per cent. The oil industry had undergone fundamental technical reorganization already by the beginning of the Five-Year Plan period, and during the Five-Year Plan period, the process of reconstruction was completed. In the iron and steel industry, the works have been entirely modernized, internal transport and the charging of the blast furnaces with ore and fuel have been mechanized, metal pouring machines have been introduced, etc. Electro-thermic processes, electro-metallurgy and electro-chemistry have been widely developed. In the machine building industry there has been an extensive departure from the system of central transmissions to the modern type of machines with individual drive. Production in the food industry has been mechanized: modern meat packing plants have been brought into operation, a powerful canning industry has been created, the fishing industry is equipped with trawlers, seiners and other modern fishing equipment. The clothing industry, boot and shoe industry, knit goods industry and a number of other branches of the light industry have been transformed from small handicraft and semi-handicract home industries into mechanized branches of large-scale industry. Agriculture has been re-equipped by the introduction of tractors, harvester combines, and reaping machines for grain and a number of technical crops.

The loading and unloading in the transport industry has been mechanized. The U.S.S.R. has achieved important successes in increasing the use of automobiles in the country.

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* According to returns of censuses of production.

All this characterizes the transition of national economy from the predominance of manual labour, and often of mediaeval technique, to labour equipped with modern means of production.

The technical revolution in the U.S.S.R.—the core of the socialist reconstruction of national economy—actually took place in all branches of national economy in the first years of the Five-Year Plan period with a profundity that capitalism could never achieve in its technical revolution. The technical revolution in the U.S.S.R. revealed to the whole world what the latest achievements in science and technique can bring about under the dictatorship of the proletariat and socialist planning; and it secured a growth of the productive forces of the Soviet Union at rates unprecedented in the capitalist world.

The U.S.S.R. increased its industrial output to 334.5 per cent compared with 1913.

The importance of this fact is particularly great when we bear in mind that in 1920 the industrial output of the U.S.S.R. was equal to only 13.8 per cent of 1913.

During the Five-Year Plan period, our industry as a whole increased on the average 21.6 per cent per annum, whereas the average annual rate of increase of the industries in group "A" * was 26.8 per cent and in group "B" ** 17 per cent.

The extremely rapid rise of socialist industry stands in striking contrast to the unprecedented decline of industry in the capitalist world. This can be seen from the following table which gives the index number of the physical volume of industrial output for a number of countries in 1932 (1928=100)***

Countries	1932
Capitalist world	67
U.S.A.	57
Great Britain	89
Germany	57
France	74
U.S.S.R.	218.5

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* Group "A" includes the production of means of production.

** Group "B" includes the production of articles of consumption.

*** Figures for capitalist countries taken from *Wochenbericht, Institut für Konjunkturforschung*, Berlin, No. 41, Jan. 11, 1933.

The gigantic growth of national economy in the U.S.S.R. and the unprecedented decline in production in the lands of capitalism —such is the general summary of the great historical rivalry between two systems: victorious socialism, and capitalism shaken by general and cyclic crisis.

IV

The successes of socialist industrialization, and on this basis, the increase of the leading role of the working class and the strengthening of its alliance with the peasantry, created enormous possibilities for the socialist transformation of agriculture and the removal in this way of its excessive backwardness.

The Sixteenth Conference of the Communist Party of the Soviet Union set before the Five-Year Plan the task of "drawing the millions of peasants into the work of socialist construction on the basis of social co-operation and collective labour, and of rendering all possible assistance to poor and middle individual farms in their struggle against *kulak* exploitation."

The task set by the Party Conference in regard to the development of the socialized sector of the rural districts was as follows: to raise the area cultivated by collective farms and State farms by 1932-33 to 17.5 per cent of the total cultivated area, and to raise the share of the socialized sector in the marketable grain output to 43 per cent of the total.

The tasks set by the Sixteenth Conference of the Communist Party were dictated by the fact that is was impossible for long to base the work of socialist construction on two different systems, i.e., large-scale socialist industry and private, technically backward, small peasant economy.

The share of socialist production in agriculture before the introduction of the Five-Year Plan was very small. The bulk of the grain was concentrated in the hands of the small and middle peasants, while a very considerable quantity of grain was held by the *kulaks* who sabotaged the grain collecting plans of the proletarian State and waged a furious struggle against the Soviet Government and the measures it desired to carry out.

Agriculture could either develop along *kulak,* capitalist lines, which is the line along which the Right opportunists tried to drag the Party, or along the lines of creating large-scale socialist agriculture by organizing collective farms and State farms, by transforming small peasant farming into large-scale collective farming and, on this basis, abolishing the *kulaks* as a class.

In pursuing the Leninist policy, the Communist Party and the working class turned the peasantry onto the road of socialism. The fulfilling of the Five-Year Plan in its very first year has proved that the transition to mass collectivization and the abolition of the *kulaks* as a class, to the organization of hundreds of thousands of collective farms, of thousands of large State farms, and of thousands of machine and tractor stations equipped with modern technique, was both possible and necessary.

The socialist offensive that was developed along the whole front, and the determined struggle that was waged against the most bitter enemies of the working class, *i.e.*, the *kulaks*, guaranteed the solution of the most difficult problem of the proletarian revolution that has arisen since the capture of power by the working class. A new collective farm system has been built up in the countryside; the *kulaks* have been crushed. The organization of State farms has developed on an extensive scale. During the Five-Year Plan period, more than 200,000 collective farms, 5,000 large State farms and nearly 2,500 machine and tractor stations have been organized, and this has fundamentally changed the face of the Soviet rural districts and has guaranteed the absolute predominance of socialist forms of rural economy. From a small peasant country, the U.S.S.R. has been transformed into a land of large-scale agriculture.

The following table shows the respective positions occupied by the socialist sector (State and collective farming) and the individual sector in agriculture.

	Total sown area (In per cent)		Average size of farm (In hectares)	
	1928	1932	1928	1932
Collective farms	1.2	68.0	42.0	434.0
State farms	1.5	10.0	544.0	2,303.0
Individual farmers .	97.3	22.0	4.5	3.15

The task set by the Sixteenth Conference of the Communist Party and the Fifth Congress of Soviets to develop the socialist sector in the rural districts has been carried out many fold. The share of the socialist sector of the sown area of all crops rose from 2.7 per cent in 1928 to 78 per cent in 1932, whereas the Five-Year Plan anticipated that the share of the socialist sector would be 17.5 per cent. In regard to the output of marketable grain, the share of the socialist sector rose to 84 per cent as against 42.6 per cent anticipated by the Five-Year Plan. The socialist sector of agriculture has become the main source of grain supply for the proletarian State.

The U.S.S.R. has organized large-scale agriculture and has brought about the greatest revolution in the technical level of agriculture. During the four years of the Five-Year Plan period, new agricultural machinery and implements were supplied to the rural districts to the value of 1,610 million rubles, whereas the total value of the implements in the rural districts at the beginning of the Five-Year Plan period amounted to 1,110 million rubles. The number of tractors available for agriculture rose during the Five-Year Plan period to 148,000 with a total of 2,225,000 h.p., whereas at the beginning of the Five-Year Plan period agriculture had available only 26,700 tractors with a total of 278,000 h.p.

As a result of this, a fundamental change took place in the role played by certain implements in the cultivation of the soil and in the harvesting of grain. The old wooden plough, which even in 1928 was still used to plough 10 per cent of the total sown area of the country, has almost entirely disappeared. Tractor ploughing is now done on more than one-third of the cultivated area, as against one per cent in 1928. The scythe and sickle, with which 45 per cent of the grain harvest was reaped in 1928, has given way to harvesting machines and combines. Hundreds of thousands of tractors, complex tractor implements, harvesting combines—these to-day characterize the new technique prevailing in socialist agriculture.

A new socialist stock-breeding industry has been created. At the end of 1932, the number of large-horned cattle in large State farms and collective farms equalled 7.6 million head (2.1 million head in State farms and 5.5 million head in collective farms). The number of pigs at the end of 1932 was 3.6 million head (950,000 in the State farms and 2.6 million in collective farms). The number of sheep at the end of 1932 was 9.9 million head (4.4 million in the State farms and 5.5 million in collective farms). Thus, the U.S.S.R. has become a country of the largest-scale stock-breeding in the world.

The Sixteenth Conference of the Communist Party set the task of "abolishing the excessive lag of agriculture behind industry, and of solving, in the main, the grain problem."

In spite of the tremendous difficulties that accompanied the task of solving the problem of creating large-scale agriculture in the U.S.S.R. in the first Five-Year Plan period, the advantages of large-scale agriculture made themselves felt in the very process of reconstruction of agriculture. This was expressed first of all in the increase of the sown area both under grain crops and under technical crops. The total sown area increased during the Five-Year Plan period from 113 million hectares to 134 million hectares. Of 21.4 million additional hectares, the area under grain crops equals 7.5 million hectares and that under technical crops equals 6.2 million hectares.

The advantages of large-scale agriculture assured in the main the solution of the grain problem.

Instead of 80 to 100 million centners of marketable grain that was collected in the period when individual farming predominated, 200 to 230 million centners are now collected annually. The position of individual farming has now been overcome in all the principal regions of the U.S.S.R., and the victory of the collective farm system, and with that the victory of socialism in the countryside, has been fully assured.

Already in the first Five-Year Plan period, the increase in technical crops secured the creation of a raw cotton base, and the possibilities of supplying the light industry with other kinds of raw material have increased enormously.

The advantages of large-scale agriculture have already made themselves felt at the present stage in the great increase in the productivity of labour in agriculture. In 1932, 14.7 million peasant holdings organized in collective farms and owning 60 per cent of the draught cattle sowed three-fourths of the total grain crops and almost one and a half times more cotton, almost twice as much sugar beet (95 per cent more) and more flax (118 per cent) than was formerly sown by 24.5 million individual peasant farms.

Such are the brilliant victories of socialism achieved in the sphere of agriculture as a result of the fulfilment of the first Five-Year Plan. This historically sums up and historically confirms the correctness of the teachings of the founders of scientific socialism that were developed by Lenin and Stalin concerning the lines of the socialist reconstruction of agriculture.

The theory advanced by the bourgeois ideologists that the restoration of capitalism in the U.S.S.R. is inevitable as a result of the growth of the capitalist elements that would arise from small individual economy has been utterly refuted. The attempts of the bourgeoisie to secure, on this basis, the restoration of capitalism, have been thwarted. The Right opportunists, who tried to drag the country onto the path of capitalist restoration, and the Trotskyists who denied the possibility of socialistically transforming the small peasant countryside, have also been smashed.

As a result of the fulfilment of the first Five-Year Plan of socialist construction, the capitalist elements of agriculture in the countryside have been uprooted; the return to capitalism on the basis of private, small peasant economy has been made impossible.

V

The industrial development of the country, the creation of a number of new industrial districts, the successful development of the socialist reconstruction of agriculture, all gave rise to an enormous development of railway and water transport.

The work of the railway transport system during the Five-Year Plan period may be summed up by stating that the main task set by the Five-Year Plan in regard to the carrying of goods and passengers has been more than fulfilled. The plan for the carrying of goods has been fulfilled to the extent of 103.6 per cent and the plan for the carrying of passengers has been fulfilled to the extent of 231.6 per cent. One of the most important indices of the work of the transport system, daily carloadings, has also been more than fulfilled. During four years, the average daily carloadings increased to 46,000 per day as against the 40,000 provided for by the Five-Year Plan for the last (1932-33) year.

The general overfulfilment of the tasks set by the Five-Year Plan to the railway transport system was secured by the improved utilization of the freight rolling stock and by the carrying out of extensive reconstruction work.

The technical reconstruction of transport was expressed in the increased general hauling power of freight train locomotives by 35 per cent, by the increase in the carrying capacity of freight cars by 25 per cent, by the increase in the average hauling power per locomotive in 1932 by 37 per cent compared with 1913, in the electrification of more than 1,400 kilometres of railway line on the most difficult grades and most congested lines (Urals, Transcaucasia, Donbas), in the increase in the proportion of open and special cars to 35 per cent (in particular the number of heavy freight cars increased by 45,000), in the increase in the carrying capacity of the most congested lines, in the equipment of 11 per cent of the freight rolling stock with automatic brakes, etc. Simultaneously, the construction of 14,000 kilometres of new railway lines was developed on an extensive scale.

Special emphasis must be laid on the achievements in the sphere of transport machinery building. During the Five-Year Plan period, the building of main line electric locomotives, Diesel locomotives, was organized, and powerful locomotives, refrigerator cars, oil cisterns, gondolas, new equipment for automatic coupling and automatic signalling, etc., are now being built.

The achievements in the work of the water transport system are equally considerable. In 1932, river freight exceeded the program of the Five-Year Plan for that year by 3.3 per cent and represented 138 per cent of the level of 1913 and 181 per cent of 1928. The number of passengers carried exceeded the plan by 50 per cent. The quantity of freight carried by the Sovtorgflot (Soviet Mercantile Fleet) nearly doubled during the Five-Year Plan period; from 8 million tons in 1928 it rose to 15 million tons in 1932. The quantity of freight handled at the ports during the Five-Year Plan period increased by 92 per cent.

Not less striking are the achievements of the Soviet Union in the development of automobile transport and civil aviation. During the first Five-Year Plan period, 93,000 kilometres of new roads have been built, whereas in 1928 the total length of roads in the U.S.S.R. was only 32,000 kilometres. The number of automobiles in the country multiplied four times as compared with the number in 1928, *i.e.,* from 18,700 to 73,000. The length of automobile lines increased from 14,582 kilometres in 1928 to 35,255 kilometres in 1932.

Pre-revolutionary Russia had no civil aviation fleet whatever. The building of an aviation fleet in the Soviet Union commenced only in 1923, and on the eve of the first Five-Year Plan period, the length of air routes equalled 11,442 kilometres, along which flights totalling 2.8 million kilometres were made, and 10,613 passengers, 93.2 tons of mail and 162.2 tons of freight were carried. As a result of the organization of new lines during the Five-Year Plan period, the length of air routes in operation has almost trebled, the number of passengers carried has also trebled and the amount of freight carried increased three and a half times. Exceptionally important achievements in this sphere were the experimental construction of aeroplanes and motors, for example, "ANT-14," "STAL-2" and others.

VI

The toiling masses of town and countryside were confronted with the task of greatly increasing the productivity of labour amidst the most profound revolution in social relationships and in the technique of production that has ever taken place, amidst conditions in which the new socialist discipline was only just being created, when the "old" still hindered the consolidation of the "new" and by that hindered the improvement of the quality of the work of hundreds of thousands of newly constructed enterprises and enterprises that have been fundamentally reconstructed in industry, agriculture and transport.

Lenin said: "We must rise to a higher level and see the historical change of social systems. Only from this point of view will it become clear what a gigantic task we have undertaken and what enormous significance attaches to the fact that this time the most advanced representatives of society, the toiling and exploited masses, are undertaking on their own initiative, that which hitherto, in serf-ridden Russia, up to 1861,* was entirely carried out by a handful of landlords who regarded it as their own private concern.

". . . The transition after 1861 to the new bourgeois economy, the transition from the old feudal discipline of the stick, from the discipline of the senseless, arrogant and brutal mockery and violence against human beings, to bourgeois discipline, to the discipline of starvation, called free wage labour, which, as a matter of fact, was the discipline of capitalist slavery—this transition proved to be historically easy, because mankind passed from one exploiter to another exploiter, because one minority of robbers and exploiters of the people's labour gave way to another minority of similar robbers and similar exploiters of the people's labour, because the landlords gave way to the capitalists—one minority gave way to another minority while the broad masses of the toilers and the exploited classes remained suppressed. But even this transition from one exploiting discipline to another exploiting discipline required years if not decades of effort, required a transitional period lasting years if not decades, during which the old feudal landlords sincerely thought that everything was doomed, that it was impossible to govern without serfdom, when the new masters, the capitalists, encountered practical difficulties at every step and became discouraged. . . .

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* The year of the emancipation of the serfs in Russia.

"We must not forget," continued Lenin, "that for the first time we have reached that preliminary point in history when the new discipline, the discipline of labour, the discipline of comradely intercourse and Soviet discipline is actually being developed by millions of toilers and exploited. We do not claim, or count on rapid success in this. We know that this will take up a whole historical epoch." *

Naturally, amidst conditions in which for the first time in human history a new socialist labour discipline of millions of workers was being created, in which the old workers were receiving a new training to fit them to the level of the modern technique of production and when many millions of new workers and technicians were first being trained in connection with the vast renewal of the technical production base, the possibilities of raising the productivity of labour could not be fully utilized in the first Five-Year Plan period.

The necessity of removing the technical and economic backwardness of the country and of increasing its defence capacity in the shortest possible time called for the overfulfilment of the plan for the construction and reconstruction of national economy. This circumstance created additional difficulties in regard to the assimilation of the enormously expanded production base and this in turn influenced the degree to which the qualitative indices ** set by the Plan were fulfilled. This explains the defects in the organization of labour in a number of industrial and socialist agricultural enterprises.

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* *Collected Works*, Vol. XXIII, pp. 43-44, Russian edition.

** Qualitative indices are: cost of production and rate of output per worker.

Notwithstanding these difficulties, however, the general increase in the productivity of labour during the Five-Year Plan period equalled 41 per cent,[**] which exceeds the highest rate of increase of productivity of labour ever achieved in America. Thus, in the period of 1920 to 1930, the average annual increase in the productivity of labour in the United States was 4.7 per cent.[**]

The lag in the increase of the productivity of labour and in the reduction of cost of production behind the Plan existed mainly in the highly labour absorbing branches of industry (coal mining, metallurgy), in which the raising of the production base to a higher technical level put with exceptional urgency the question of retraining the bulk of the old workers, of training new workers and of reorganizing the whole process of production. The same thing took place in agriculture in which an entirely new system of large-scale socialist agriculture was introduced, in which tens of millions of collective farmers and State farm workers, departing from the century-old production and social habits of private farming passed to the methods of production required in large-scale socialist enterprises.

The situation in those branches of industry, in which the process of technical re-equipment had been completed in the main before the first Five-Year Plan period, was different. Thus, in the oil industry, cost of production during four years of the Five-Year Plan period was reduced by 38 per cent as compared with 33 per cent set by the Plan. The electrical engineering industry reduced cost of production 35.7 per cent as compared with 42 per cent set by the Plan.

The important successes achieved in regard to raising the productivity of labour in the first Five-Year Plan period were determined by the successes achieved in creating the new socialist labour discipline which arose in our enterprises during the Five-Year Plan period and without which it would have been impossible to solve the enormous problems of the Five-Year Plan. The new character of production relationships, socialist competi-

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[*] Preliminary calculations of the State Planning Commission of the U.S.S.R. based on the incomplete returns for 1932 showed an increase in the productivity of labour of 38 per cent. The figure of 41 per cent quoted here is based on report statistics.

[**] National Bureau of Economic Research, quoted in the *Journal of the American Statistical Association*, December 1932.

tion, shock brigade work, cost accounting brigades, counterplans, etc., provided the new forms of the class attitude towards labour which has become a matter of honour, glory, valour and heroism.

The enormous achievements in socialist labour discipline are due to the great victories which the working class of the U.S.S.R. achieved during the first Five-Year Plan period in educating a proletarian intelligentsia and particularly technical cadres, and also in raising the general and technical level of education of the workers. During the first Five-Year Plan period, 284,000 new engineers and technicians of high and medium grade entered the national economy of the U.S.S.R. Millions of workers attended the extensive network of technical courses, technicums, evening universities and evening technical universities that were organized. The factory training schools trained 300,000 young skilled workers for industry and 450,000 for national economy as a whole.

The new socialist discipline that arose, and the growth of the class consciousness and activity of the masses of the toilers, served as the basis upon which the successes of socialist construction in the first Five-Year Plan period were achieved, and now they serve as a firm basis for raising this socialist construction to a still higher level in the second Five-Year Plan period.

VII

On the basis of the industrialization of the country and of the upswing of agriculture, the Sixteenth Conference of the Communist Party and the Fifth Congress of Soviets planned for a considerable improvement in the material and cultural level of the working class and of the masses of the toilers in the countryside.

During the Five-Year Plan period, a victory of utmost historical importance was achieved—unemployment was abolished. At the beginning of the Five-Year Plan period there were still one and a half million unemployed in the U.S.S.R. By 1930, however, unemployment had disappeared in the U.S.S.R. During the Five-Year Plan period, the number of workers and employees in the U.S.S.R. rose from 11,590,000 to 22,180,000.

This is in striking contrast to the systematic absolute decline in the number of employed workers in the capitalist countries during this period. Thus in the United States, the number of workers employed in the manufacturing industries dropped from 8,232,000 in 1928 to 5,970,000 in 1932. In Germany, in the same period, the number of workers employed dropped from 17,996,000 to 12,518,000.* At the same time, the number of workers employed part time increased considerably.

In the United States, the index of employment in the manufacturing industries dropped from 97 in 1928 to 62.2 in 1932 (1923-25=100). In Germany, the percentage of employment in industry in 1932 was 41.6.** According to the American Federation of Labour, the number of unemployed in the United States is eleven million; in Germany it exceeds six million. According to the official returns of the League of Nations the number of unemployed in all capitalist countries was over thirty million in 1932.

In the U.S.S.R., the average annual wage per worker rose from 703.4 rubles in 1928 to 1,432.4 rubles in 1932, *i.e.,* an increase of 103.6 per cent. The payroll of workers and employees increased from 8.16 billion rubles in 1928 to 32.66 billion rubles in 1932, an almost four-fold increase. The social insurance funds increased four-fold. In capitalist countries, however, we see a sharp reduction in wages. During the period 1928-32, the payroll of workers in the U.S.A. employed in the manufacturing industries was reduced from 10,275 million dollars in 1928 to 4,052 million dollars in 1932; in Germany the payroll dropped from 42.6 billion marks in 1928 to 25.7 billion marks in 1932. During this same period, the average monthly wage per worker in the U.S.A. dropped from 104 dollars to 56.5 dollars.***

Simultaneously with the abolition of unemployment in the first Five-Year Plan period, the poor peasants and the lower middle peasants were relieved from *kulak* bondage; the economic level of the poor peasants who joined collective farms was raised to the level of the middle peasants; the possibility of the class differentiation of the peasantry into property-owning and property-less has been abolished, and in connection with this, pauperization and impoverishment in the rural districts have been abolished.

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* Figures for Germany taken from the *Konjunkturstatistisches Handbuch* for 1933. Figures for the U.S.A., *Bradstreet's Journal*, February 25, 1933.

** Figures for the U.S.A., from the Federal Reserve Board Bulletin, February 1933. Figures for Germany taken from *Wochenberichte* of the *Institut für Konjunkturforschung*, Berlin, February-March 1933.

*** Figures for the United States taken from *Bradstreet's Journal*, February 25, 1933. Figures for Germany, *Wochenberichte, Institut für Konjunkturforschung*, Berlin, March 1933.

These great historical victories in the improvement of the material conditions of the peasantry in the U.S.S.R. are particularly striking on the background of the unprecedented pauperization of the peasantry in the capitalist countries, who are being steadily ruined by the growing world crisis.

The improvement of the material and cultural conditions of the toilers in town and country in the U.S.S.R. was facilitated by the growth of the light and food industries. At the beginning of the Five-Year Plan period, a considerable section of the light and food industries represented backward branches of economy and in their development relied to a considerable degree upon imported equipment and imported raw material. The acceleration of the growth of the heavy industry and agriculture guaranteed the creation in the first Five-Year Plan period of a base for home machine building and also a home base for raw materials for these branches of industry.

Notwithstanding the difficulties that accompanied the development of the light and food industries on the basis of domestic machines and raw materials, already in the first Five-Year Plan period the U.S.S.R. managed to secure the rapid growth of these branches of industry. The average annual increase of output of the industries in group "B" in the period of 1929 to 1932 equalled 17 per cent, which considerably exceeds the increase in the production of articles of general consumption in capitalist countries. Thus, the average annual rate of increase in the production of articles of general consumption in the period of 1925 to 1929 was: in the United States, 1.4 per cent and in Germany, 3.1 per cent. In England in the same period, there was a drop in the output of articles of general consumption of 1.9 per cent.*

Important successes were also achieved in the sphere of Soviet trade. The total volume of goods handled by the co-operative and State trading system at the end of the Five-Year Plan period was 175 per cent of that of 1928 (calculated at fixed prices). The share of the socialized sector of retail trade in the towns at the beginning of the Five-Year Plan period was equal to 80 per cent. By the end of the Five-Year Plan period, socialized trade (State, co-operative and collective farm) controlled the whole of the stationary retail trade system. Soviet trade is trade without capitalists or speculators. On the basis of the victory of collective farming, an entirely new form of Soviet trade has arisen—collective farm trade, which serves as a powerful lever in the struggle for the organizational and economic consolidation of the collective farms and for the improvement of the material well-being of the toilers in town and country. At the same time it serves as a means for completely eradicating the capitalists and speculators from the sphere of circulation.

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* *Sonderheft*, No. 31, *Institut für Konjunkturforschung*, Berlin, 1933.

While the turnover of commodities in the U.S.S.R. is increasing, in the capitalist countries there is a sharp reduction in trade. The index numbers of the turnover of department stores in the United States for 1932 show a diminution of 35.2 per cent as compared with 1928. In Germany in the same period, there was a reduction of retail trade by 36.4 per cent.*

The U.S.S.R. has achieved enormous successes in city improvements and in the improvement of municipal services for the toilers. There has been an increase in the number of towns with tramways (from 41 to 50), water supply (from 293 to 367) and drainage systems (from 36 to 367). The medical services for the toilers have been improved. A large number of crèches and kindergartens have been established, and public catering has been developed to an enormous extent.

The improvement of the material conditions of the working class and of the masses of the toilers in the countryside is reflected in the growth and change of structure of the national income. In 1932 the national income of the U.S.S.R. equalled 45.5 billion rubles (calculated at the prices of 1926-27), *i.e.,* an increase of 86.1 per cent as compared with 1927-28.

Thus the rate of increase of the national income of the U.S.S.R. far exceeds the rate of increase of the national income of tsarist Russia which, on the average, ranged from 2.5 per cent to 3 per cent per annum; and it also exceeds the rate of increase of the national income of the most advanced capitalist countries like the United States, which even in the best years of its pre-war development (1880-1890) showed an average increase of national income of only 8 per cent per annum.*

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* Figures for Germany, *Vierteljahrshefte, Institut für Konjunkturforschung,* Berlin, No. 4, 1932. For United States, *Survey of Current Business,* February 1933.

The share of the whole of the private sector in the total national income of the U.S.S.R. declined during the Five-Year Plan period from 50.3 per cent in 1928 to 12.9 per cent in 1932. At the same time the share of the incomes of the workers and employees in the total income of the population increased during the Five-Year Plan period from 35.6 per cent in 1928 to 55.7 per cent in 1932; the share of the collective farmers rose from 1.3 per cent to 27.3 per cent in the same period and that of artisans and home workers organized in co-operative societies rose from 1.4 per cent to 2.9 per cent. The share of the socialist sector in the national income rose from 49.7 per cent in 1928 to 87.1 per cent in 1932.

All this shows that the task set by the Five-Year Plan to improve the material conditions of the toilers in town and country has been fulfilled, and as far as the decisive and fundamental indices are concerned, has been more than fulfilled. In fact, the Five-Year Plan anticipated that by the end of the Five-Year Plan period unemployment would be reduced from 1.5 million to 400,000, whereas unemployment was completely abolished in the U.S.S.R. in 1930. The Five-Year Plan provided for the reconstruction of agriculture on a smaller scale than was actually accomplished and therefore, did not anticipate that the factors making for the class differentation, pauperism and impoverishment in the countryside, would be eliminated. For the same reason, the Five-Year Plan did not anticipate that the poor peasant question would be solved and that the material well-being of the poor strata of the rural population would be improved to such an enormous extent as was actually achieved as a result of the victorious development of socialism in town and countryside.

The enormous progress achieved in the sphere of the cultural revolution can be judged by the fact that whereas formerly an enormous percentage of the population of the U.S.S.R. was illiterate, at the present time, practically the whole population is literate. In 1913, the number of people able to read and write in Russia was equal to 33 per cent of the total population; in 1932, this figure rose to 90 per cent. In 1931-32, universal, compulsory, elementary education was introduced. The press, the output of books and magazines, and the number of clubs, village reading rooms and libraries have grown to an enormous degree.

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* Calculated on the basis of the figures quoted by Wilford King in *The National Income and its Purchasing Power*, 1930.

VIII

The Sixteenth Conference of the Communist Party set before the country the task of taking an important step forward in the first Five-Year Plan period towards realizing the slogan: "Technically and economically to overtake and surpass the advanced capitalist countries." The Party Conference called for an increase in the U.S.S.R.'s share in world production so that in the output of pig iron the U.S.S.R. should occupy third place (after Germany and the U.S.A.) and in the output of coal, fourth place (after the U.S.A., Great Britain and Germany).

Expanded socialist reproduction in the U.S.S.R. during the Five-Year Plan period and the decline of production in the capitalist countries altered the position of the U.S.S.R. in world production.

The place now occupied by the U.S.S.R. in regard to the basic industries of the world compared with 1913 and 1928 is shown in the following table:

			1932	
	1913	1928	World	Europe
Electric power	15	10	6	4
Coal	6	6	4	3
Pig iron	5	6	2	1
General Machine Building*	4	4	2	1
Oil	2	3	2	1
Agricultural Machinery	—	4	1	1
Tractors	—	4	1	1
Peat	—	—	1	1
Automobiles	—	12	6	4
Total industrial production	—	5	2	1

* Figures for 1931, calculated on the figures of the share of the various countries in the world output of machinery, published by the *Institut für Konjunkturforschung*, Berlin, in August 1932. Figures for 1913 according to the data of the *Industrie des Constructions Mechaniques*, Vol. I, 1925.

The above figures show that the task set by the Sixteenth Conference of the Communist Party has not only been fulfilled but more than fulfilled. Instead of third place in the production of pig iron, the U.S.S.R. holds second place (after the U.S.A.). In coal output it has already taken fourth place as called for by the Sixteenth Conference of the Communist Party. The industrial power of the U.S.S.R. has grown to such an extent that in regard to total industrial products the U.S.S.R. has moved from the fifth place in the world to the second, and in regard to the share of industry in the general economy of the country, and also in regard to the share of heavy industry in the total output of industrial products it has caught up with countries like Germany and the U.S.A.

The proletariat of the U.S.S.R. supplemented these exceptional victories in the rivalry of the Soviet Union with the capitalist world by important victories in realizing the slogan "overtake and surpass" in the sphere of agriculture.

The might of the Soviet system was strikingly reflected in the transformation of the U.S.S.R. into a land in which agriculture and stock-breeding are carried on on a larger scale than anywhere else in the world. Without this, a decisive change in the development of the productive forces in agriculture based on the application of science and modern technique, a problem which capitalism has not solved to this day, would have been impossible.

* * *

The task set by the Five-Year Plan was successfully carried out in four years.

In the first Five-Year Plan period, the socialist forms of economy became the absolutely predominant forms in the U.S.S.R. The question as to "who will win"—collective or private enterprise—has been settled, not only for the towns, but also for the countryside. The foundation of socialist economy has been laid. The U.S.S.R. has entered into the period of socialism.

The Soviet Union has created its own industrial base for the reconstruction of industry, transport and agriculture. From the position of a backward country, the U.S.S.R. has moved into the front rank of the technically and economically highly developed countries. From an agrarian country, it has been transformed into an industrial country, and it has developed its machine building industry on a scale that will secure the production of the decisive share of the equipment for Soviet enterprises and by that, it has to an enormous degree increased the technical and economic independence and defence capacity of the country.

In spite of the assertions of the bourgeoisie and of its armour bearers, the Mensheviks, that the proletariat, having destroyed the old world, is incapable of building up a new socialist world, the working class of the U.S.S.R. led by the Communist Party headed by Joseph V. Stalin, transformed the Five-Year Plan into a real and tangible fact which is incorporated in the profound class changes that predetermine the final and irrevocable victory of socialism in the U.S.S.R., is incorporated in hundreds of thousands of industrial and agricultural enterprises that have been created in the Five-Year Plan period, and in the exceptionally significant achievements in the improvement of the material conditions of the toilers in town and country.

The economic and political positions of the proletarian dictatorship have been reinforced; the leading role of the working class has immeasurably increased. The most dangerous enemy of the proletarian revolution, the *kulaks,* has been routed. Owing to the fact that the bulk of the peasantry have been transformed into collective farmers, the alliance with the peasantry has been reinforced on a firmer foundation.

The Soviet Government is the most firmly established government in the world.

The victory of socialism has decisively turned the intelligentsia to the side of the Soviet Government. The overwhelming majority of the intelligentsia have firmly taken up the position of the October Revolution. Tens of thousands of new proletarian specialists have poured into the ranks of the intelligentsia and have thus changed its social composition and political complexion.

The position of the proletarian dictatorship has become consolidated in the republics of the national minorities and districts that were formerly economically and culturally backward. The socialist geographic distribution of the productive forces of the country during the Five-Year Plan period has transformed these former colonies of tsarist Russia into important proletarian centres having strong native proletarian cadres.

The defence capacity of the country has been considerably strengthened. During the Five-Year Plan period, the U.S.S.R. has become a mighty country capable at any time of repelling any attempt at armed intervention.

Overcoming enormous difficulties connected with the necessity of simultaneously solving the problems of creating a heavy industry, of developing light industries, of reconstructing agriculture and of improving the material conditions of the toilers in town and country, the U.S.S.R. is successfully coping with all these problems and is presenting to mankind the socialist type of industrialization of the country.

The U.S.S.R. did not have long-term foreign loans to help it to solve all these problems; it solved them with its own resources, by the growth of internal accumulation, by drawing into productive labour the whole of the able-bodied population of the country and abolishing unemployment, and by abolishing the consumption of parasitic elements, by encouraging science and technique, by rousing a socialist attitude towards labour and by creating fundamentally different relations between town and country.

As a result of socialist industrialization and the victory of large-scale agriculture, the U.S.S.R. in the first Five-Year Plan period succeeded in removing the main disproportions in national economy, the lag of industry behind the requirements of national economy, the excessive lag of agriculture behind industry as a consequence of its small peasant character, and by that it has crossed the most difficult barrier of internal difficulties. This in its turn has created the possibility of removing, during the second Five-Year Plan period, certain partial disproportions which still remain (the lag of the output of the iron and steel industry and transport behind the general rate of increase of national economy, the complete abolition of the lag of agriculture).

The fulfilment of the Five-Year Plan has revealed the enormous advantages of the young and not yet completely developed socialist system. Already in the process of the reconstruction of national economy, the U.S.S.R. secured a gigantic development of the productive forces during the first Five-Year Plan period which translated the theory that socialism is a higher form of social production than capitalism into the language of facts and figures.

The victory of the Five-Year Plan has irrefutably proved the historical correctness of the teachings of Marx and Lenin concerning the road of emancipation of the exploited and oppressed masses from the power of capital and concerning the building of a new and higher social system: socialism.

The gigantic achievements of the first Five-Year Plan made it possible to set, in the second Five-Year Plan, the task of finally abolishing the capitalist elements and of classes generally, and of transforming the whole of the working population of the country into conscious and active builders of classless socialist society; it has also permitted the raising of the great question of completing the technical reconstruction of the whole of the national economy of the Soviet Union, of bringing the U.S.S.R. to the first place in Europe in regard to technical development, and of finally securing the technical and economic independence of the U.S.S.R.

CONSTRUCTION

THE construction program was the pivot of the first Five-Year Plan. The removal of the technical and economic backwardness of the U.S.S.R., its transformation from a backward agrarian country into an industrial country, the creation of its own heavy industry base, the technical re-equipment of agriculture in the process of its collectivization—all these tasks presented by the Five-Year Plan called for the widest development of the construction of new enterprises and the penetration of new technique into all branches of national economy, primarily into the heavy industry.

During the years preceding the first Five-Year Plan period, the fixed capital of the national economy that was inherited from pre-revolutionary times, and was destroyed in the course of the imperialist war and civil war, was restored; but only a small part of it was reconstructed. Capital investments in national economy during this period amounted, according to approximate calculations, to 26.5 billion rubles of which 11.1 billion rubles were invested in the socialized sector.* Capital investments in industry during these years amounted to 5.2 billion rubles, the bulk of which was devoted to the capital repair and restoration of old enterprises; only 700 million rubles were devoted to the construction of new enterprises.

An important part of these investments was turned into agriculture, amounting approximately to 15 billion rubles. The bulk of this sum was invested by small individual peasant farmers.

Such are the main figures that characterize the scope and structure of the work of construction in the restoration period.

The Five-Year Plan provided for capital investments in the whole of national economy for the five years to the amount of

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* Belonging to State or co-operative organizations.

64.5 billion rubles, of which 46.9 billion rubles were to be invested in the socialized sector of national economy; of this sum 19.1 billion were invested in industry and 7.2 billion in agriculture.

The very dimensions of these figures show very distinctly the immensity of the tasks set by the Five-Year Plan. Investments on such a scale implied an enormous development of the productive forces of the country, a fundamental change in the relations between industry and agriculture in the direction of increasing the importance of industry and of procuring for it the leading role in national economy, and great progress in the technical re-equipment of the country.

The problems set by the Five-Year Plan were solved by the work of construction carried out in the socialized sector, which occupied the predominant place in the sum total of investments in industry. Construction in the private sector was limited mainly to construction of a non-productive character (the building and repair of dwellings in town and countryside) and to investments by individual peasant farms in the purchase of implements and cattle and the building and repair of farm buildings.

The fulfilment of the gigantic construction program laid down by the Five-Year Plan demanded firstly, a considerable mobilization of financial resources and secondly, the creation on an adequately large scale of special industries able to provide building materials, steel products and equipment for the enterprises to be constructed.

In solving these two difficult problems the U.S.S.R. was unable to rely on foreign long-term loans. The only way open was to seek these resources within the country. The socialist nature of planned economy was the fundamental premise for the possibility of the solution of these problems in so far as it abolished the parasitical waste of the national income, called into being colossal resources that lay dormant in the socialist attitude towards labour on the part of the broad masses of the toilers, and placed into the hands of the proletarian State a powerful system of levers that enabled it to pursue a systematic policy of mobilizing resources, of redistributing the national income and directing it into the channels of the industrialization of the country.

Great difficulties had to be overcome in solving the problem of creating the material conditions for accumulation of capital, because, at the beginning of the Five-Year Plan period, the volume of industrial output and the very composition of industrial production prevented them from serving as an adequate base for the wide development of construction.

The production of building materials and equipment of all kinds at the beginning of the Five-Year Plan period was sufficient to enable the Soviet Union to fulfil a construction program amounting to 4 to 5 billion rubles per annum; but the Five-Year Plan provided for bringing the investments up to 13 billion rubles per annum by the end of the Five-Year Plan period.

In the very first years of the Five-Year Plan period, exceptionally high rates of development in the branches of the heavy industry, primarily in engineering, were necessary in order to make the production capacity of industry conform to the construction program of the Five-Year Plan.

The possibilities of solving this problem were created by the fact that the national economy of the U.S.S.R. had entered into the first Five-Year Plan period after having already assimilated the production capacity of the old enterprises and, relying on the expansion of output of these enterprises, it became possible to mobilize large resources for the purpose of constructing new enterprises.

The creation of a number of new industries called forth a number of special difficulties that did not exist at the beginning of the Five-Year Plan period, and the existence of which was a necessary condition for the fulfilment of the construction plan and of the plan for the technical re-equipment of all branches of national economy. These new industries, such as machine-tool construction, automobile and tractor industry, the production of equipment for mining and metallurgy, electrical industry, etc., either did not exist at all, or were in an embryonic state at the beginning of the Five-Year Plan period. Without accelerating the development of these industries in the first place, it would not have been possible to fulfil the construction program laid down in the Five-Year Plan.

Finally, the very character of the construction provided for in the Five-Year Plan called for a decisive transition from handicraft methods of construction, from the technique employed by peasants united in primitive building co-operatives, to industrial methods of construction; it called for the creation of a powerful building industry equipped with up-to-date machinery, skilled workers, a network of auxiliary enterprises, etc. The very complicated problems of construction designing had to be solved by resorting to foreign technical aid while gradually training Soviet designers and accumulating technical experience so that the Soviet Union might stand firmly on its own feet in this respect.

Such were the problems that had to be solved in order to fulfil the construction program of the Five-Year Plan.

During the Five-Year Plan period the total capital investments in national economy amounted to 60 billion rubles, of which 52.5 billion rubles* were invested in the socialized sector. Thus the most important and decisive part of the Five-Year Plan of construction was overfulfilled, which rendered possible the overfulfilment of the volume and scope of the technical reconstruction of national economy planned. During the years of the Five-Year Plan period, construction in the private sector of national economy was carried out approximately to the amount of 7.5 billion rubles. The changes in the Five-Year Plan brought about by the acceleration in the rate of collectivization of peasant agriculture and the building of State farms also brought about a sharp change in the relations between the private and socialized sectors, and this in turn changed the proportion of capital investments in the respective sectors as compared with the original Five-Year Plan.

The following are the main figures depicting the fulfilment of the construction program of the Five-Year Plan in the socialized sector of national economy (in billions of rubles calculated at prices prevailing in the respective years):

	Investments according to 5-Year Plan	Fulfilment (in percentages)			1932 to 1928-29	Per cent for 4¼ years to Five-Year Plan
		1928-29	1932	Total 4¼ years		
Total socialized sector	46.9	5.4	19.3	52.5	357.4	111.9
Of which:						
Industry	19.1	2.3	9.6	24.8	417.4	129.8
Of which:						
Group "A"	14.7	1.8	8.4	21.3	466.7	144.9
Agriculture	7.2	0.9	3.3	10.8	366.7	150.0
Transport	9.9	1.1	3.6	9.8	327.3	99.0

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* The previously published figures of 48.4 billion rubles were calculated on the basis of preliminary returns, and did not cover investments in local road construction and collective farms.

In the first year of the Five-Year Plan period capital work was carried out to the amount of 5.4 billion rubles. In the last year of the Five-Year Plan period investments were increased to 19.3 billion rubles, *i.e.*, a three and a half fold increase. The volume of capital investments in the four and a quarter years exceeded the figures of the Five-Year Plan, which were calculated for five years, by 11.9 per cent.

While the total sum of investments in the socialized sector of national economy as a whole was exceeded, the amount of capital investments in industry exceeded the Five-Year Plan to an even greater extent, particularly in the heavy industry. This main result very strikingly depicts the enormous distance the U.S.S.R. has travelled in the direction of industrializing and technically reconstructing national economy.

In the first year of the Five-Year Plan period industrial construction represented 42.7 per cent of the total volume of investments in the socialized sector of national economy, but in the last year of the Five-Year Plan period the proportion was raised to 49.8 per cent. Investments in the heavy industry, which in the first year of the Five-Year Plan period represented 33.3 per cent of the total volume of investments and 78.2 per cent of the investments in industry, rose in the last year of the Five-Year Plan period to 43.6 per cent of the total volume of investments in national economy and to 87.6 per cent of the investments in industry. Investments in the last year of the Five-Year Plan period amounted to more than four times the amount invested in the first year in the whole of industry, and more than four and a half times the amount invested in heavy industry.

Unlike the character of construction in the restoration period, the first Five-Year Plan was a plan for the enormous development of *new* construction.

Of the total investments in industry during the Five-Year Plan period, a great part was invested in the construction of new enterprises, the overwhelming majority of which were huge structures, models of modern technique. The share of new construction systematically increased from year to year in the Five-Year Plan period, and in the last year it represented one-half of the total investments.

The distribution of capital investments in *industry* is strikingly illustrated in the following table (per cent):

	1928-29	1932
New construction	27.7	46.3
Extensions and reconstruction . .	45.5	27.5
Capital repairs	9.3	4.0
Other investments	17.5	22.2
Total	100.0	100.0

In analysing these figures it must be borne in mind that in a number of cases the reconstruction of enterprises already in operation brought about such an increase in their fixed capital, and such a rise in their technical level, that as a matter of fact they actually became new enterprises. To illustrate this it can be stated that taking twenty-three selected engineering works as an example, we find that as a result of reconstruction their fixed capital increased from 258 million rubles at the beginning of the Five-Year Plan period to 494 million rubles on January 1, 1932; the number of workers they employed increased in the same period from 54,800 to 139,700 and their volume of output increased from 284 million rubles to 1,295 million rubles, or four and a half times. Among these works are the Dynamo, Electrozavod, Electropribor, Electrosila, Red Putilovetz, Communar and Hammer and Sickle, all of which today represent large enterprises equipped with modern technique.

The gigantic work of construction carried out during the first Five-Year Plan period gave rise to a number of huge new enterprises which are the strongholds of the technical revolution; it resulted in the renewal and reconstruction of old enterprises, and brought into being a powerful heavy industry, which assures the completion of the reconstruction of the whole of national economy during the second Five-Year Plan period and which has brought the U.S.S.R. into the front ranks of the advanced industrial countries of the world.

The creation of a heavy industry base in the U.S.S.R. and the increase in the production of agricultural raw materials made it possible greatly to accelerate the rates of development and to increase capital construction in the light and food industries. Very considerable investments in the light industries were made, particularly in the last years of the first Five-Year Plan period.

The results of the Five-Year Plan in the sphere of *agricultural* *construction* are of enormous significance. The original Five-Year Plan of investments in the socialized sector of agriculture has been exceeded one and a half times in the course of the four and a quarter years. This overfulfilment of capital work in agriculture is the direct result of the rates and dimensions achieved in the socialist reconstruction of agriculture, which far exceed those anticipated in the Five-Year Plan.

Capital investments in the socialized sector of agriculture in the first year of the Five-Year Plan period amounted to 0.9 billion rubles, representing 16.6 per cent of the total investments. In the last year of the Five-Year Plan period, investments in agriculture amounted to 3.3 billion rubles, which represented 17.1 per cent of the investments, which had risen enormously, and 366.7 per cent of the total investments in agriculture in the first year of the Five-Year Plan period.

Complex agricultural machinery to a value exceeding 1.5 billion rubles, and 150,000 tractors delivered to agriculture during the Five-Year Plan period, the organization of 2,500 machine and tractor stations, huge irrigation and amelioration work, industrial and housing construction in collective and State farms, the erection of repair shops, socialized cattle sheds, etc.—all these new implements and new types of agricultural construction have created a material base for agricultural enterprises of a larger scale than anywhere else in the world.

The technical re-equipment of agriculture that has been achieved in the Five-Year Plan period has rendered it possible to extend the sown area, and particularly the area under grain crops, to a considerable degree.

Simultaneously with this, special significance attaches to the expansion that has been achieved during the Five-Year Plan period in the area under technical crops that are necessary to provide a raw material base for the growing light industries. This called for the enormous development of irrigation work, for the irrigation of cotton fields and fields for other technical crops. The investment of 840 million rubles in irrigation work during the Five-Year Plan period secured an increase in the irrigated area, during the four years, of 650,000 hectares and at the same time brought into use such huge irrigation schemes as, for example, the Vakhsh irrigation scheme, which will secure the further extension of the area of crops under irrigation in future years.

One of the great victories of the Five-Year Plan was the creation of a material base for the development of socialized stock-breeding on a wide scale, based on a broad network of stock-breeding State and collective farms. A new type of stock-breeding farms has been created on a high level of technique, with a high output of marketable cattle and with cattle of improved breed.

The organization of 200,000 collective farms, 5,000 large State farms, and 2,500 machine and tractor stations are in their very nature an entirely new form of construction, which has no precedent in the history of agriculture. These new enterprises, equipped with tractors and complex agricultural machinery, and having at their disposal a great number of buildings required in agriculture, occupied the predominant position in agriculture towards the end of the Five-Year Plan period.

The new collective farm system which was created during the Five-Year Plan period received great financial and material assistance from the proletarian State. In an exceptionally short period of time agriculture has undergone a profound technical revolution. Such are the results of the Five-Year Plan of capital construction in the sphere of agriculture.

Investments in *transport* systematically increased from year to year in the Five-Year Plan period, and during the four and a quarter years amounted to 9.8 billion rubles. This secured a considerable development and reconstruction of the main lines and junctions, an increase in the system of railway lines in operation, an increase in the number of railway cars and locomotives, an increase in the tonnage of the river and maritime fleet, and the development of hydro-technical and harbour construction. Great successes were achieved in the development of automobile and particularly of aerial transport, which at the beginning of the Five-Year Plan period was at a very low level of development in the U.S.S.R.

In regard to railway transport, in view of the enormous growth of the requirements of the country for transport facilities in the process of fulfilling the Five-Year Plan, it was found necessary to change the direction of capital investments provided in the Five-Year Plan towards concentrating these investments on the lines already in operation at the expense of some of the new railway construction provided for in the Five-Year Plan. The concentration of investments upon the lines already in operation rendered possible the overfulfilment of the Five-Year Plan in regard to the work of the transport system, greatly increased the carrying capacity of the principal trunk lines, and permitted the initiation of extensive reconstruction of the transport system on the basis of modern technique.

The introduction of powerful locomotives, special cars and cars of large tonnage, the modernization of the existing rolling stock, the improvement and the reconstruction of tracks, the extensive introduction of automatic brakes on freight cars, the introduction of automatic signalling and the mechanization of loading and unloading became facts towards the end of the Five-Year Plan period which materially contributed towards the increase in the freight carrying capacity of the railway system. At the same time, a powerful base was constructed during the first Five-Year Plan period for the manufacture of transport machinery which will enable the U.S.S.R. to increase the capacity of all forms of transport and to bring about their fundamental technical reconstruction on a still larger scale in the future.

The fulfilment of the plan of new railway construction secured the development of new railway lines on a total length of 14,000 kilometres of which 6,500 kilometres were put into use during the years of the Five-Year Plan period. The transport construction of the Five-Year Plan linked up the main centres of the country with a number of new industrial centres which were created in the Five-Year Plan period, stimulated the rapid economic and cultural development of the formerly backward regions of national minorities, and secured a great increase in the freight carrying capacity of the transport system. New forms of transport have been created, the extensive technical reconstruction of transport has commenced, and a powerful base has been created for the completion of this reconstruction in the second Five-Year Plan period.

A large program of capital work has been carried out in all branches of *housing, municipal, social and cultural construction.*

Such are the general results of the fulfilment of the construction program of the Five-Year Plan in the main branches of national economy.

The tens of billions of rubles invested in construction have been converted into hundreds of thousands of new industrial, agricultural and transport enterprises; they have to an enormous extent increased the productive capacity of the fixed capital of national economy in operation, and have sharply changed their structure in the direction of enormously increasing the industrial power of the U.S.S.R.

Construction was particularly extensive in the last years of the Five-Year Plan period, in which also the largest number of new enterprises and of new shops, of reconstructed shops and factories were put into operation.

This growth of construction very clearly illustrates the superiority of the Soviet system of economy over the capitalist system. Whereas in the U.S.S.R. construction of new enterprises developed on an enormous scale and abolished the technical and economic backwardness of the country, created a technically advanced industry and reconstructed all the branches of national economy, construction in capitalist countries sharply declined, as can be seen from the following table:

Indices of construction *

	U.S.S.R.	U.S.A.	Germany
Year	Capital construction	Index of building permits in 37 States	General index of construction
1928	100.0	100.0	100.0
1932	357.4	20.8	37.6

A more than three and a half fold increase in construction in the U.S.S.R., a drop to almost one-fifth in the United States, the most powerful country in the modern capitalist world, such are the results of the rivalry between the two systems—the socialist system and the capitalist system—in the sphere of construction, a sphere which determines the rate and scale of development of the productive forces and of the technical re-equipment of national economy.

The fulfilment and overfulfilment of the construction program of the Five-Year Plan permitted the starting of a large number of new enterprises.

The starting of operation of the new fixed capital in the socialized sector of national economy during the years of the Five-Year Plan period is shown in the following table (billions of rubles in prices of the respective years):

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* Figures for U.S.A. from the Federal Reserve Bulletin for March 1933; Germany—from *Konjunkturstatistisches Handbuch*, 1933.

	1928-29	1932	Total for 4¼ years
Total for socialized sector of national economy	4.4	14.5	40.5
Of which: Industry	1.8	5.7	15.3
Agriculture . . .	0.7	3.0	9.7
Transport	0.8	3.2	8.8

The enormous sum of 40.5 billion rubles characterizes the increase in the fixed capital of the socialized sector of national economy as a result of the first Five-Year Plan. The amount of fixed capital operating in the socialized sector of national economy doubled during the Five-Year Plan period. The value of new fixed capital in industry starting operation amounts to 15.3 billion rubles, which more than doubles, and in the heavy industry trebles, the value of the fixed capital in operation in the period prior to that of the first Five-Year Plan.

It is extremely important to note the circumstance that, in addition to fulfilling this program of bringing new enterprises into operation, the work of construction in the first Five-Year Plan period has resulted in the preparation of a huge amount of partly finished construction which will permit the number of new enterprises to be put into operation within the next few years to be increased to an enormous degree. At the beginning of the Five-Year Plan period the amount of uncompleted construction calculated in capital investments amounted to 1.7 billion rubles, or 31 per cent of the annual sum invested. Although the huge program of starting new enterprises outlined above was carried out, the value of the uncompleted construction at the end of the Five-Year Plan period amounted to 13.7 billion rubles, or 76 per cent of the total plan of capital work for 1933. Notwithstanding this enormous increase in the volume of uncompleted construction there is a considerable increase in the ratio of the amount of capital invested in each single construction job to the general cost of this job. Thus, during the first years of the Five-Year Plan period, outlays on uncompleted construction jobs represented from 20 per cent to 22 per cent of the total costs of the objects under construction; but on

January 1, 1933, this percentage increased to 34-35, thus showing a considerably greater preparedness of these structures for starting operation.

At the end of the Five-Year Plan period the total projected costs of large construction jobs amounted to the gigantic sum of over thirty billion rubles: of these, one-third have already been invested, and the great majority of these construction jobs are ready for complete or partial operation next year or, at most, the year after next.

During the Five-Year Plan period, over 1,500 new factories and works have been started, among which are gigantic works which occupy a commanding place in industry.

As a result of the construction work carried out, the economic level of the formerly backward republics and regions of national minorities of the Soviet Union has been considerably raised. The new geographic distribution of industry has given rise to new industrial centres. Of exceptional importance is the creation of the second coal and metallurgical base in the East, known as the Ural-Kuzbas Combine, which was built up in an exceedingly short period, and on a tremendous scale.

In order to appreciate the importance of the newly created industrial units in the fixed capital of the economy of the Soviet Union, it will be sufficient to quote examples from the important branches of the latter.

In the coal industry, the planned output capacity of the new large pits put into operation during the Five-Year Plan period amounts to over 50 million tons per annum. Already in 1932 these pits supplied 22 per cent of the total output of the coal industry, and in 1933 their output will increase to 35 per cent of the total.

In the oil industry the number of wells in operation in 1932 was 5,986, as compared with 4,760 at the beginning of the Five-Year Plan period. In 1931, the output of wells which were in operation in the period before the Revolution represented only 5 per cent of the total output. Of special importance are the new units created during the Five-Year Plan period in the oil refining industry, in which 66 per cent of the capacity of the primary refining plants was created during the four years of the Five-Year Plan period. The whole system of cracking works, consisting of twenty-four units, with a capacity of 3.3 million tons of crude oil per annum, is entirely new.

'In the iron and steel industry, new blast furnaces alone, not counting those that have been reconstructed, represent 25 per cent of the total blast furnaces in the country and 62.5 per cent of the output capacity of the blast furnaces in operation at the beginning of the Five-Year Plan period.

'In the engineering industry, of the total number of machine-tools in operation in 1932, 44.4 per cent were installed during the Five-Year Plan period. Taking separate branches of the engineering industry, *e.g.*, automobiles, tractors, machine-tool construction, etc., the percentage of new equipment rises to 80 per cent and 95 per cent.

The output capacity of the Soviet engineering industry has reached the level of that of Germany, but it exceeds it in degree of concentration and in technical level. Of special significance is the circumstance that the re-equipment of the engineering industry, to which reference was made above, has enabled the Soviet Union to become independent of foreign countries for equipment. In pre-war times, 43.6 per cent of the total equipment of the national economy of Russia was imported, in 1927-28 the proportion of imported equipment dropped to 23.8 per cent, in 1931 to 14 per cent and in 1932 it was still lower. In 1913, imported industrial equipment represented 63.8 per cent of the total equipment in operation, on the eve of the Five-Year Plan period this proportion was 32.5 per cent, and in 1931 it dropped to 17.8 per cent.

'In the chemical industry, with the exception of certain of the most simple productions, all processes are now carried out in powerful units created during the Five-Year Plan period.

'In the timber industry, out of the 2,700 saw mill frames in operation at the end of the Five-Year Plan period, 1,000 were put up during the Five-Year Plan period. The output capacity of the frames put up in this period represents 50 per cent of the total output capacity of the industry.

'In the cotton industry, during the Five-Year Plan period, about 1 million new spindles were installed, of which 650,000 were installed in new cotton mills. As a result of this, the number of spindles in operation in the cotton industry has increased to 8.25 million. Moreover, the output capacity of the spinning mills has increased to a much larger extent owing to the installation, mainly, of more efficient equipment.

A considerable increase in output capacity was also achieved in other branches of the light industry and, in addition, a number of new branches were formed which did not exist at the beginning of the Five-Year Plan period.

An entirely new, large-scale food industry has been created to take the place of the former primitive methods of working up agricultural produce.

The geographic distribution of the new enterprises in the light and food industries is marked by their being shifted to the East, by setting up industrial enterprises in proximity to the the existing main bases of agricultural raw materials and by creating new bases of raw materials.

On January 1, 1932, the *fixed capital of industry* had been renewed to the extent of 57.5 per cent,* while on January 1, 1933, the proportion of renewed equipment represented considerably more than 60 per cent. Moreover, the renewal of the fixed capital in a number of branches of industry is so great that in effect we have here newly created branches of industry.

In regard to electric power stations the renewed capital at the beginning of 1932 represented 81.9 per cent, in the oil industry 82.6 per cent, in the coal industry 75.8 per cent, in electrical engineering 69.3 per cent, in iron and steel 56 per cent, general engineering 67.2 per cent. Taking the whole of Group "A," renewed capital represents 63.5 per cent of the total, and in group "B," 29.9 per cent.

The increase of the *technical equipment* of the transport system during the four years of the Five-Year Plan period is seen in the increase in the length of railways in operation, in the increase in the traction power of freight locomotives by 35 per cent, in the increase in the capacity of freight cars, and in the increase in the number of special and self-unloading cars. The river propelled fleet has increased its carrying capacity by 54 per cent, and the carrying capacity of the non-propelled fleet has risen by 81 per cent. The Soviet maritime fleet has grown to an even larger extent and has more than doubled its carrying capacity (104 per cent). Moreover, 50 per cent of the new tonnage has been built in Soviet shipyards. The number of automobiles in the U.S.S.R.

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* The coefficient of the renewal of the fixed capital is calculated at the per cent of the value of the new capital put into operation after the stock-taking of October 1, 1925, of the value of the total fixed capital.

has increased fourfold and the network of automobile roads has increased by 14,600 kilometers, and now reaches a total of 35,200 kilometres.

In order to characterize the new productive capacity in agriculture it is sufficient to point out that the tractors in use at the end of the Five-Year Plan period reached a total of 2,225,000 h.p. and that the value of agricultural machinery at the beginning of the Five-Year Plan period amounted to 1.1 billion rubles, and during the years of the Five-Year Plan period increased to 2.4 billion rubles after an allowance had been made for depreciation.

The enormous increase in the productive capacity achieved as a result of starting new enterprises, to a very considerable degree has raised the technical level of industry in other branches of national economy also, and in a number of cases it has created entirely new forms of technical organization of production processes.

Construction in the first Five-Year Plan period gave rise to a new type of enterprise, the so-called combine, with a complex organization of technological processes, the all-sided utilization of primary sources of raw materials and power and linked up with a large number of other enterprises on the basis of specialization and co-operation in production. This type of enterprise guarantees the greatest economy in the utilization of all forms of raw material, and the utmost utilization of technical achievements, the broad realization of which in capitalist countries is restricted by the limitations of private property.

In the most important branches of industry a large number of the newly constructed enterprises, and those under construction in the first Five-Year Plan period, are combines. For example, in engineering—the Kramatorsk, Sverdlovsk and other large works; metallurgy—Magnitogorsk, Stalinsk, Zaporozhstal and others; chemical industry—Bobriki, Berezniki, Voznesensk, Yaroslavl Rubber and Asbestos Works, etc.; textiles—Tashkent, the Melange mills at Ivanovo-Voznesensk, and others; food industry—the meat combines in Moscow, Leningrad, Semipalatinsk and others.

All these enterprises, a considerable number of which are already in operation, are the largest and leading enterprises in their respective industries, and in the second Five-Year Plan period they will fulfil a great part of the production program of that plan.

The construction of large and technically perfect enterprises that were carried out in the first Five-Year Plan period predetermined an intensive process of *industrial concentration.* In 1925 and 1926, electric power stations of a power not exceeding 30,000 to 50,000 kw. were built. In the course of the first Five-Year Plan period, however, the main types of station built were those of 150,000 to 200,000 kw. and over. The average power of district stations* in the restoration period ranged from 19,000 to 20,000 kw. In 1932, however, the average power of district stations rose to 61,000 kw.

In the coal industry (in the Donbas) the average annual output per pit in operation in pre-war times was 21,000 tons. In 1927-28 the average output per pit was 80,000 tons. At the end of the Five-Year Plan period, the average output per pit was 127,000 tons, and the average planned capacity of the new pits that were started, in the course of the Five-Year Plan period amounts to 400,000 tons. The type of pit that was under construction at the end of the Five-Year Plan period was that of a capacity of 1,000,000 tons and more, per annum.

At the beginning of the Five-Year Plan period, the average size of blast furnaces in operation was 290 cubic metres. At the end of the Five Year Plan period, however, the average size had risen to 360 cubic metres, thanks to the starting of new huge blast furnaces of an average size of 700 cubic metres, some even reaching the size of 1,180 cubic metres.

While at the beginning of the Five-Year Plan period, the average capacity of an open hearth furnace in the South was about 35 tons, and in the Urals 30 tons, most of the furnaces now reaching completion have a capacity of 100 tons and over.

Metallurgical works with an annual output of 1,000,000 to 1,200,000 tons of pig iron are becoming typical of the units in the new metallurgical industry now being constructed.

At the beginning of the Five-Year Plan period, the type of coking plant that was built was that with an annual output of 415,000 tons. Later, the output per unit was increased to 650,000 tons, for the series of ovens to be started first, and 1,300,000 tons. for the complete plant. Moreover, a large number of the coking plants that have been under construction during the past two years are being built according to the latter type. As a result, three-fourths of the output of the coking industry has been concentrated in twelve new enterprises, having a total of 1,685 ovens.

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* This term is applied to large (not less than 24,000 kw.) public utility power stations supplying power to the enterprises of the respective district.

In the engineering industry, the concentration of production finds expression primarily in the fact that a number of the largest enterprises in the world has been built. It is sufficient to mention the automobile and tractor plants, the harvester combine works, the ball-bearing plant in Moscow, the heavy engineering works in Sverdlovsk and Kramatorsk, which have an output capacity of 100,000 to 150,000 tons of machinery per annum.

In the new timber industry, half the total number of frames are concentrated in saw mills with from five to twelve frames.

The examples quoted are sufficient to illustrate the type of new industrial construction and of the reconstruction of existing enterprises that was carried out in the course of the first Five-Year Plan period.

The new industries created during the first Five-Year Plan period, the new types of equipment—most modern machine-tools and powerful forge and pressing equipment in engineering works, the new type of hoisting and transport equipment, blast furnaces of 1,000 cubic metres, powerful blooming mills, continuous rolling mills, concentrating equipment in the iron and steel industry, high pressure installation in the chemical industry, apparatus for intensifying chemical processes, powerful electrical equipment, etc.—the whole of this system of new means and implements of labour absorbed in industry has raised its technical level to an enormous extent.

The electrification of industry, the introduction of electricity into the technological processes, the extensive mechanization of labour absorbing processes, the development of mass conveyor production, the specialization and co-operation of enterprises—in all these directions the technical re-equipment of the Soviet economy in the Five-Year Plan period has achieved important results.

From a backward peasant country the U.S.S.R. has been transformed into a country of powerful and technically advanced industry, a country in which agriculture is carried on on a scale larger than anywhere else in the world. A base has been created for completing the technical reconstruction of national economy,

which was already developed widely during the first Five-Year Plan period.

Such are the results of the fulfilment of the construction program of the Five-Year Plan.

INDUSTRY

AT the beginning of the Five-Year Plan period, the output of the census industry had already considerably exceeded the pre-war level. According to returns of the first Five-Year Plan (see Vol. I of *The Five-Year Plan),* the output of the census industry in 1927-28 amounted to 13.9 billion rubles, calculated at prices prevailing in 1926-27, *i.e.,* 135.6 per cent of 1913.*

In 1928 a number of branches of industry had already left the level of 1913 far behind. Thus, the production of electric power, the production of peat, the construction of boilers and turbines, agricultural machinery, boots and shoes, etc., had more than doubled. At the same time, however, a number of branches of industry had not yet reached the pre-war level. For example, the output of iron ore in 1928 represented only 67.6 per cent of 1913; the output of pig iron, 80 per cent; copper, 92 per cent, construction of locomotives, 92.4 per cent; railway car construction, 79.2 per cent.

Although profound structural changes accompanied the process of restoration in industry and a considerable increase of output above the pre-war level was achieved in a number of industries, industry in the U.S.S.R. as a whole only entered into the phase of broad and all-sided reconstruction. The complicated and difficult road of reconstructing the whole of the technical base of industry, of solving the problem of upbuilding and mastering fixed capital, was still ahead.

In 1928, the U.S.S.R.'s share in the industrial output of the whole world was only 4.7 per cent. In that year, the U.S.S.R. in regard to industrial output stood behind the U.S.A., Germany, Great Britain and France, and occupied fifth place. Compared with other countries, the industrial output of the U.S.S.R. represented 10.5 per cent of that of the U.S.A., 40.5 per cent of Germany, 67.1 per cent of France, 50 per cent of England, but exceeded that of Italy by 46.9 per cent.*

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* According to more precise returns, industrial output in the beginning of the Five-Year Plan period exceeded the pre-war level by 43.8 per cent; in 1927-28 industrial output amounted to 14,740 million as compared with 10,251 million in 1913.

The first Five-Year Plan put the figure of industrial output for 1932-33 at 36.6 billion rubles. The output of the census industry in 1932 amounted to 34.3 billion rubles, calculated at the fixed prices of 1926-27, which indicates that the Five-Year Plan was carried out in the course of four and a quarter years to the extent of 93.7 per cent. The volume of industrial output in 1932, *i.e.*, in four years, was 218.5 per cent of the industrial output of 1928, and 334.5 per cent of the output of 1913.

In conformity with the task of industrializing the country, set by the Five-Year Plan, the growth of the heavy industry was much more rapid than the growth of industry as a whole.

In the industries in group "A," the Five-Year Plan was fulfilled to the extent of 103.4 per cent, in the heavy industry, which is under the control of the People's Commissariat of Heavy Industry the plan was fulfilled by 109.6 per cent. Compared with 1928, the production of the means of production increased 2.6 fold and compared with the pre-war period, 4.2 fold.

The industries in group "B" fulfilled their plan to the extent of 84.9 per cent. The output of the branches of industry in group "B" in 1932 was 187.3 per cent of 1928, and 273.5 per cent of the output of the corresponding industries in 1913. Although the light industries did not fulfil the Plan, the food industries overfulfilled it. The slower rate of development of the industries in group "B," during the first Five-Year Plan period, is due to the fact that it was necessary to accelerate the development of the heavy industry in view of the policy that was adopted to put an end to the technical and economic dependence of the U.S.S.R. on capitalist countries in the shortest possible historical period; it was also due to the necessity to create a firm home basis for the development of the light industries in the form of a home engineering industry and raw material base.

The exceptionally high rates of growth of industrial output, which were dictated by the necessity to overcome, as quickly as possible, the technical and economic backwardness of the country and to strengthen its power of defence, were achieved as a result of the expansion of production in the old and reconstructed enterprises already in operation, while at the same time a large number of new enterprises and industries were created and mastered.

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* *Wochenbericht* of the *Institut für Konjunkturforschung*, Berlin, No. 41, January 11, 1933.

The average annual increase of output in the census industries in the period of 1928-32 was 21.6 per cent, which exceeds the average annual increase of 21 per cent provided for in the original Five-Year Plan. For the separate years, the increase of output compared with the preceding year was as follows: 1929—126.1 per cent; 1930—127.3 per cent; 1931—122.6 per cent; 1932—111 per cent.

The increase in industrial output in absolute figures rose from year to year and was as follows: 1929—4.1 billion rubles; 1930—5.4 billion rubles; 1931—5.7 billion rubles; 1932—3.4 billion rubles, calculated at the fixed prices of 1926-27. The drop in 1932 was due to the necessity of transferring part of the industries to work on requirements of defence, which for several months caused a reduction in the output of the ordinary production in a number of enterprises, and it was also due to the difficulties connected with the assimilation of the large amount of new fixed capital which was put into operation.

The exceptional sweep of industrial development during the Five-Year Plan period is particularly striking when compared with the rates of increase of industrial output in capitalist countries before the crisis of 1929, and also with the decline of industrial output in capitalist countries during the years of the crisis.

While the industrial output in the U.S.S.R. during the four years 1928-32 increased by 118.5 per cent, and by 234.5 per cent compared with 1913, the industrial output of the U.S.A. during the sixteen years from 1913 to 1929 increased by only 70 per cent, that in Great Britain declined by 1 per cent, in Germany it increased by 3.1 per cent and in France by 38 per cent.*

In the peroid 1929-32, the index of the volume of industrial output decreased for the U.S.A.—57 per cent; Germany—57 per cent; France—74 per cent; England—89 per cent and the capitalist world as a whole—67 per cent.**

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* Special Supplement of the *Wochenberichte* of the *Institut für Konjunkturforschung,* Berlin, No. 19. 1933.

** *Wochenbericht* of the *Institut für Konjunkturforschung,* Berlin, January 11, 1933.

During the years of the Five-Year Plan period, the structure of Soviet industry underwent a radical change. In 1913, the output of the census industry of group "A" represented 41.8 per cent of the output of the census industry as a whole. In 1928 the share of the census industry of group "A" rose to 44.3 per cent and in 1932 to 52.5 per cent, whereas the Five-Year Plan anticipated that it would represent 47.5 per cent in the last year of the Five-Year Plan period. Correspondingly, the proportion of the industries in group "B" declined from 55.7 per cent in 1928 to 47.5 per cent in 1932.

The changes that have taken place in the relations of the various branches of industry in the U.S.S.R. are exceptionally characteristic. In 1913, for example, the output of the general engineering industry represented 6.6 per cent of the output of the industry as a whole, whereas in 1928, it represented 9.3 per cent, and in 1932 more than 21 per cent. In the proportion of the production of machines to the whole of industrial production, the U.S.S.R. has overtaken the most advanced industrial countries of the world. For example, in the United States, the output of the engineering industry in 1929 represented 17.2 per cent of the output of industry; in Germany, in 1927-28—10.8 per cent and in Great Britain, in 1930—13.8 per cent.*

If the various branches of industry in the U.S.S.R. are placed in order corresponding to their rate of growth compared with 1928 and 1913, a very instructive picture of the development of industry will be obtained. Ahead of all the industries in regard to rate of growth compared with 1927-28 are the electrical engineering and agricultural machinery industries, the output of which increased by more than 5.5 fold; then follow general engineering, the output of which increased 4.4 fold; the output of electric power by the district power stations, which increased 4 fold; the iron and steel industries which increased 3.5 fold; the mining, lumber and building material industries, which increased their output 2.5 to 3 fold; and the fuel industries, which increased their output 2.3 fold. The clothing industries increased their output 3.5 fold, and the food industry, 2.2 fold.

All these branches of industry exceed the general rate of increase achieved by census industry as a whole.

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* Figures: United States, Census of 1929; Germany, *Vierteljahrshefte, Institut für Konjunkturforschung*, Berlin, No. 4, 1932, Part A; Great Britain, Census of 1930, quoted in *The Economist*, March 3, 1933.

Not less characteristic is the relation between the various branches of industry, according to the rapidity of development achieved, compared with 1913. In this respect the majority of the branches of industry just enumerated are well in front, but at the top of the list are the district electric power stations, which in 1932 produced 15.4 times more electric power than in 1913. Then follow the production of agricultural machinery, which increased its output 16 fold and created an entirely new technical basis for the development of agriculture; electrical engineering and general machine building which has grown 10 fold; non-ferrous metals the output of which increased 11 fold and the boot and shoe industry, which increased its output 10 fold.

The rate of growth of the various branches of industry clearly expresses the fundamental changes that have taken place in national economy as a result of the process of industrialization. The principal policy pursued here was: electrification, mechanization, upbuilding of a domestic metal base and the chemicalization of the whole of national economy.

During the Five-Year Plan period the fixed capital of industry was re-equipped, renewed and developed to an enormous degree. A new technique has been created, and the output capacity of the apparatus of industry has grown to an enormous extent.

It should be observed that, in addition to the new enterprises, the increase in productive capacity, to a large degree, is due to the reconstruction of the old enterprises and works. This also explains the fact that a large share of the goods produced by the industries during the Five-Year Plan period was produced by the old and reconstructed works and enterprises. Thus, in the coal industry, notwithstanding the enormous growth of the output of new pits, about four-fifths of the coal produced in 1932 was produced by the old pits. In the iron and steel industry, of 6.2 million tons of pig iron produced in 1932, the new works produced 930,000 tons, *i.e.,* a little more than one-seventh of the total, the rest being produced by old reconstructed works.

In a number of branches of industry in which the process of reconstruction was completed earlier than in the others, for example, in the oil industry, the preponderant share of the output falls to the new enterprises and new equipment. Thus, in 1931, 95 per cent of the oil produced came from wells that had been sunk by the Soviet Government. We have a similar situation in regard to the production of electric power. The fixed capital laid down in the years of the Five-Year Plan period could not be utilized to its complete production capacity in the first Five-Year Plan period.

The preponderant share of output in the first Five-Year Plan period came from the old and reconstructed enterprises, where the problem of assimilating the fixed capital presented fewer difficulties. The most important task of the second Five-Year Plan period must be the complete assimilation of the enormous amount of fixed capital represented by the new enterprises and works which started operation in the First Five-Year Plan period and whose output will be developed to greater dimensions in the second Five-Year Plan period.

Already in the first Five-Year Plan period the development of industry has shown that great progress has been made by a number of branches of industry in mastering their production. In a number of these branches of industry the task of reducing cost of production was in the main fulfilled, and in some of them more than fulfilled. For example, the oil industry had the task of reducing cost of production in the course of the five years by 33 per cent, but it succeeded in the course of four years in reducing cost of production by 38 per cent; in the electrical engineering industry the reduction of cost of production was planned at 35.7 per cent, it achieved 42 per cent; in general engineering the plan was 30 per cent and the achievement 38 per cent.

One of the most important results of the first Five-Year Plan was the solution of the problem in industry as to "who will win," private industry or socialist industry—was the final victory of socialist forms of industry already in 1930. This was achieved already in the first years of the Five-Year Plan period. At the present time the whole census industry is socialist industry.

During the first Five-Year Plan period we had the simultaneous rapid development of State as well as co-operative industry, in which the form of handicraft associations *(artel)* predominates. The output of the producing co-operative associations, including invalids' and timber-working co-operatives, reached great dimensions, and in 1932 it amounted to 6,230 million rubles (calculated at planned prices of 1932). Co-operative industry plays a great part in the industrial life of the country. It is connected with State industry and supplements it in a number of ways (supplies supplementary raw material, produces auxiliary materials, works up State raw materials and semi-finished goods, produces articles for the general market, etc.). At the same time the industrial co-operative industry comes forward as a special means for the socialist remoulding of the small home-worker and, on the basis of the co-operative organization of production, draws him into the common socialist channel of industrial development.

Private industry, which, in the beginning of the period of the New Economic Policy, played a noticeable role in the census industry, was practically squeezed out in the very first years of the Five-Year Plan period as a consequence of the successful development of the socialist, State and co-operative industry.

In 1930, 56.4 per cent of the total number of enterprises in the census industry were State enterprises and 43.5 per cent were co-operative enterprises. Private enterprises represented only 0.1 per cent of the total in the census industry. Of the total output of the census industry, the State enterprises in this category produced 88.9 per cent, the co-operative enterprises, somewhat less than 11.1 per cent and private enterprises, less than 0.1 per cent. These figures convincingly prove the complete victory of socialist industry.

As a result of the enormous growth of industrial output, the specialization of industry and the rise of a number of new industries, a change has taken place in the structure and organization of the management of industries, in the organization of the management of the various branches of industry, in the structure of the co-operative industrial apparatus, etc., the object of which was to improve business management and to make it more concrete.

It is sufficient to refer to the formation of a number of new industrial People's Commissariats in place of the former Supreme Council of National Economy (People's Commissariat of Heavy Industry, People's Commissariat of Light Industry, People's Commissariat of Timber), and the reorganization of industry with a view to improving economic accounting, and the reorganization of the industrial co-operative societies.

Having developed at an enormous rate during the Five-Year Plan period, having reconstructed its technical base, and having changed its internal structure on the basis of a large increase of the heavy industry and the creation of new branches of industry,

industry has greatly increased its reconstructive role in national economy.

On this basis socialist reconstruction has spread and, as a result, an up-to-date advanced industry was created, agriculture was reconstructed, the foundation of socialist economy was completed and the building up of a classless socialist society during the second Five-Year Plan period was thus secured.

How great is the reconstructive role which industry has acquired in the national economy of the U.S.S.R. can be seen in particular from the quantity of material values which industry has supplied to the country during the Five-Year Plan period and which it is in a position to supply at the end of the Five-Year Plan period.

The iron and steel industry was able to secure the supply of metals to the engineering industry. The rolled metal utilized by the general engineering and iron and steel industries increased from 47.9 per cent in 1926 to 68.1 per cent in 1929-30 and to more than 71 per cent in 1931-32.

Industry has made exceptional progress in supplying the country with modern equipment and new technique. Industry has exercised a revolutionizing influence upon the whole system of agriculture. As far as the supply of tractors to agriculture is concerned the capacity of industry is growing year after year. For example, during the four and a quarter years, agriculture received 153,900 tractors, but in 1932 the industry of the U.S.S.R. alone supplied 50,000 tractors. The total output of agricultural machinery in 1932 was almost five and a half times more than that of 1927-28.

According to the Five-Year Plan, the consumption of fuel for industrial and technical purpose should have amounted to 94 million tons of conventional fuel.* Actually, the amount of fuel consumed in 1932 was 96 million tons of fuel, *i.e.,* 102.2 per cent of the plan for the last year of the Five-Year Plan period.

In 1932 railway transport received 21,612 freight cars and 827 locomotives. Moreover, it should be observed that during the first Five-Year Plan period, the industries producing machinery for transport underwent considerable reconstruction and are now in a position to produce powerful and modern rolling stock.

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* One metric ton of fuel representing 7 million large calories.

Industry has created a new technical base for the light and food industries and by that has created the material basis for an enormous increase in the production of articles of general consumption and for a further improvement of the material well being of the masses of toilers.

A firm base has been created for the defence of the country.

Having increased to an enormous extent its reconstructive role in the whole of national economy, industry has at the same time so enormously increased its share in the general production of the country that there is every justification in declaring that one of the most important results of the first Five-Year Plan is that the U.S.S.R. has been transformed from an agrarian country into an industrial country.

MACHINE BUILDING

As a result of the fulfilment of the Five-Year Plan, one of the most important economic and political directives of the Communist Party of the Soviet Union "to transform the Soviet Union from a country importing equipment into a country that manufactures equipment" (Resolution of the Fourteenth Congress of the Communist Party of the Soviet Union) has been fulfilled. The engineering industry fulfilled its Five-Year Plan in three years. In 1932 the industry exceeded its plan of gross output by 57 per cent. During the four years of the Five-Year Plan period the manufacture of machinery increased four-fold. Machine building has become a powerful base for the technical reconstruction of the national economy and for the defence of the country.

The U.S.S.R. has advanced to the front rank of world machine building industry. According to the *Institut für Konjunkturforschung,** Berlin, already in 1931 the U.S.S.R. occupied second place after the U.S.A. in the production of machinery. In that year the U.S.S.R. produced more than one-fifth of the world's output of machinery. The place occupied by the U.S.S.R. and the capitalist countries in the world output of machinery is shown in the following table:

Year	U.S.S.R. %	Germany %	Great Britain %	France %	U.S.A. %
1928	*4.0*	*13.7*	*10.8*	*2.2*	*56.9*
1931	*21.4*	*13.9*	*15.0*	*3.8*	*36.9*

The total horse power of prime movers—which is the most common index of the productive capacity of the engineering industry in the U.S.S.R. and in capitalist countries—shows that the Soviet engineering industry is approximately on the level of Germany. In the U.S.S.R., the total horse power of prime movers in the engineering industry amounts to 1.1 million while that in Germany amounts to 1.3 million.**

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* *Wochenbericht* of the *Institut für Konjunkturforschung, Berlin.*

** Both for the U.S.S.R. and Germany, electrical engineering is not included. The data refer to enterprises with more than fifty workers and employees.

It must be emphasized that planned economy provides such opportunities for utilizing the capacity of the apparatus of production as are inconceivable under capitalist economy. According to the returns of the census of equipment, the average number of shifts in which metal working equipment was employed in the engineering industry in the U.S.S.R. was: two shifts for cutting machines, and 1.8 shifts for stamping machines and presses. Thirty per cent of all the cutting machines and 22 per cent of all the stamping machines and presses work three shifts.* According to the returns of the *Institut für Konjunkturforschung,* Berlin, the load of the engineering enterprises in Germany in 1929 (at the peak before the crisis) was only 67.8 per cent of full load in one shift, and this dropped in 1932 to 27.1 per cent.

The technical re-equipment of national economy that has taken place during the years of the Five-Year Plan period, and the necessity for solving the problem of fixed capital, called, in the first place, for the reconstruction of the engineering industry.

The backwardness of Soviet machine building at the beginning of the Five-Year Plan period necessitated a gigantic construction of new works and the reconstruction of old works. Already at the beginning of 1932, 67.2 per cent of the fixed capital in general engineering and 69.3 per cent of the fixed capital in electrical engineering had been renewed. This enormous construction served to give the engineering industry the leading role in the technical reconstruction of national economy.

It can be said in the literal sense of the word that the engineering industry of the U.S.S.R. was created during the years of the dictatorship of the proletariat. Compared with 1913, the output of machinery has increased ten-fold. According to the returns of the census of equipment, of all the machine-tools installed in engineering enterprises in the U.S.S.R., in the beginning of 1932—66.6 per cent were installed after the Revolution and 44.2 per cent were installed in three and a quarter years of the Five-Year Plan period (from 1929 to April 1932). In regard to productivity—perfection of construction and efficiency—the machine-tools installed during the Five-Year Plan period occupy an even more significant place. The following table shows the distribution of metal working machinery according to the year of installation:

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* Moreover, it should be observed that in view of the fact that a large number of works have only just been started, they are only working one shift and this reduces the average number of shifts worked by the total number of machines.

(Per cent of total)*

Before 1917	1918-22	1923-27	1928	1929	1930	1931	1st quarter 1932
33.4	3.7	13.8	4.9	6.0	12.4	19.7	6.1

The number of newly installed machine-tools increased year after year during the Five-Year Plan period. More machine-tools were installed in the first quarter of 1932 than for the whole of 1929.

The enormous growth of the engineering industry during the Five-Year Plan period took place on a higher technical basis: the industry was reorganized on the basis of mass and large serial production; it was technically re-equipped and its structure was changed.

The concentration of production considerably increased in the Five-Year Plan period as is shown by the size of the enterprises classified according to the number of persons employed. This is shown in the following table which also gives a comparison with that of Germany:

Enterprises with Number of Workers

	From 51 to 200	From 201 to 500	From 501 to 1,000	From 1,001 to 2,000	From 2,001 to 5,000	Over 5,000
	(In percentages to total number)					
U.S.S.R., Jan. 1, 1929						
Enterprises	35.7	30.6	14.6	9.1	6.7	3.3
Workers and employees	4.6	10.9	11.8	14.2	23.5	35.0
Jan. 1, 1932						
Enterprises	25.0	21.6	19.1	15.5	11.1	7.7
Workers and employees	1.7	4.1	8.0	12.5	20.4	53.3
Germany, 1925						
Enterprises	69.9	18.3	6.4	3.4	1.5	0.5
Workers and employees	22.0	18.3	14.5	15.0	15.4	14.8

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* According to the returns of the equipment census as on April 10, 1932.

In the beginning of 1932 more than 50 per cent of the workers and employees in the engineering industry in the U.S.S.R. were employed in large works having over 5,000 workers. In Germany enterprises of this type employ only 14.8 per cent of the total number of workers and employees in the industry.*

Although the above figures apply only to the first three years of the Five-Year Plan period and do not reflect the giant new works that were started in 1932, for example, automobile works, the Ball-Bearing Works, and the new machine-tool works, they nevertheless indicate the enormous concentration of production that has taken place during the first Five-Year Plan period.

The characteristic feature of the bulk of our engineering works at the beginning of the Five-Year Plan period was the universal nature of their output. The high degree of concentration, the reconstruction of old works and the construction of new giant engineering works secured the prominence at the end of the Five-Year Plan period of mass and large serial production. In 1932, the mass production works, which played an insignificant role in the beginning of the Five-Year Plan period, produced 48.6 per cent of the total output; of these, the works at which the mass conveyor system is employed produced 35.1 per cent. The mass production and large serial production works together produced 74.4 per cent of the total output of the engineering industry in 1932.**

During the Five-Year Plan period, we achieved considerable progress in the specialization of engineering works. Especially marked success was achieved in this respect in agricultural machinery, electrical engineering, machine-tool industry, and in the manufacture of precision instruments. To a considerable degree the production of general works equipment (cranes, pumps, compressors), the production of which until recent years was scattered over a number of enterprises, has been concentrated in special enterprises. The new automobile and tractor factories represent the highest form of specialization on a single type of machine. The specialization of a number of enterprises on the production of machine parts (armatures, parts for automobiles and tractors, etc.) and the construction of new central foundries, of the Ball-Bearing Works and other works, have laid the foundation for the extensive planned co-operation of factories.

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* For the purpose of comparison, enterprises employing up to fifty workers and employees have not been included.

** According to the returns for the first half of 1932.

The transition to mass, specialized production was based on the extensive introduction of the most modern metal working machinery into the Soviet engineering industry.

Automatic and semi-automatic, multiple cutting and multiple spindle machine-tools almost doubled in proportion to other machine-tools during the first three and a half years of the Five-Year Plan period. Two-thirds of these special, complex and to a large extent automatic machines, were installed after 1928.

In the new and fundamentally reconstructed branches of engineering, for example, the automobile and agricultural machinery industries (including tractors), the proportion of automatic machines is higher than in the corresponding branches of industry in the U.S.A. In the automobile industry in the U.S.S.R., turret lathes represent 8.4 per cent of the total number of lathes, while in the U.S.A. they represent 7.9 per cent; in the agricultural machinery industry the figures are 3.1 per cent in the U.S.S.R., 1.3 per cent in the U.S.A.*

The tremendous increase in the proportion of grinding machines to the total number of machine-tools employed in the engineering industry during the three years of the Five-Year Plan period (from 2.3 per cent to 6.5 per cent, not including tool grinding machines), indicates the success with which new methods of machining metals has been introduced and which assures the precision without which the modern conveyor methods of assembly based upon the interchangeability of parts would be impossible. In order to describe the rate at which grinding is being introduced, it is sufficient to state that 45 per cent of the grinding machines in operation were installed during the past two years.

Pressed steel products are being introduced to an increasing extent on the basis of mass production to the exclusion of less effective methods of metal working. Fifty-four per cent of the press equipment for coal work was installed in our engineering industry during the past two and a quarter years. Nearly all the steam presses have been installed in the Five-Year Plan period.

The extent to which foundries have been reconstructed in the Five-Year Plan period is illustrated by the following figures showing the extent of the introduction of mechanical pattern making.

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* Figures for the U.S.S.R. taken from the census of equipment, 1932. Figures for U.S.A., from *American Machinist*, 1930.

Types of moulding machines	No. of machines in April 1932	Proportion of machines installed in 3¼ years of Five-Year Plan period Per cent
Hand filling	3,221	*44.3*
Mechanical filling . . .	1,110	*88.2*

During the Five-Year Plan period, electrical and gas welding has been widely introduced, particularly in railway car building, agricultural machinery, ship-building and electrical engineering. Of the 2,451 gas welding machines employed in the beginning of 1932, 84 per cent were installed during three years of the Five-Year Plan period, and 72 per cent in two years. Out of 6,649 machines for electrical welding the coresponding figures are 89.3 per cent and 84.9 per cent.

The overwhelming majority of the welding machines (74 per cent) were produced in Soviet enterprises.

The successes achieved in the technical re-equipment of Soviet machine building are strikingly illustrated by the results achieved in the sphere of electrification of the industry.

The transition of the engineering industry from mechanical drive to electric motor drive was practically completed in 1932. The coefficient of the electrification of the engineering industry as a whole represents 98 per cent.

The electrification of the engineering industry was brought about on the basis of the centralization of electrical supply and the decentralization of electrical distribution. In 1928 the engineering works obtained 33.3 per cent of all their electric power from district electric power stations; in 1929 they obtained 39.2 per cent; in 1930—58.0 per cent and in 1931—74.1 per cent.

At the same time there was an intensive process of transition from general transmitters, from motors serving a whole shop, a group of machines, to individual motors serving a single machine. The following table shows the percentage of machines working with individual motors in 1932:

	Metal cutting machines	Presses	Woodworking machines
Machines working with individual motors	40.4	60.9	49.7
Of which: individual electric motors through transmission	33.7	50.6	44.0
Flange motors	4.7	9.9	1.8
Embedded motors	2.0	0.4	3.9

Almost half the machines employed in the engineering industry at the beginning of 1932 were with individual drive. The most perfect forms of the electrification of production, which abolishes intermediary links (the transmission), and in which the motor is joined to the working machine—the attachment of a flange motor to the shaft of the machine and the embedded motor in which the rotor of the motor and the shaft of the machine represent a single whole—already play a marked role in the Soviet engineering industry.

The adaptation of machine-tools to individual electric drive was carried out, in the main, during the Five-Year Plan period. Of the pre-revolution machine-tools now in use, only 15 per cent are working with individual motors; of the machine-tools installed before 1928 only 18.7 per cent are working with individual motors; but of the machine-tools installed in 1932, two-thirds are equipped with individual motors. The proportion of machine-tools working with individual motors in 1927 and 1928 must have been considerably smaller because the greater part of old machines was adopted for individual drive only in the past two or three years.

A fundamental change has taken place in the branch structure of the engineering industry in the U.S.S.R. In addition to the old branches of engineering, which have become considerably stronger during the Five-Year Plan period, new branches of engineering have been created, for example, the manufacture of automobiles and tractors, metallurgical machinery, mining machinery, chemical machinery, aeroplane motors, radio apparatus, measuring and optical instruments, etc.

There is not a branch of the engineering industry that is lacking in the U.S.S.R. now, at the beginning of the second Five-Year Plan period. With the equipment available, there is not a single machine that cannot be produced in this country.

In conformity with the fundamental tasks of industrializing the country, those branches of machine building which are most important for the reconstruction of national economy and, in the first place, of heavy industry, have been most developed.

POWER MACHINERY AND EQUIPMENT

The Five-Year Plan attached special importance to the development of the production of electric power generators. During the

Five-Year Plan period, the production of prime movers as well as the production of electric power station equipment, which was in a rudimentary state in 1928, were developed into large branches of machine building. This is seen from the following table giving the figures of the output of power generators in 1928 and in 1932:

Type of Machine	1928	1932
Steam turbines (thousands kw.) . .	34.0*	702.0**
Hydro-turbines (thousands h.p.) . . .	—	79.6
Diesel engines (thousands h.p.) . . .	40.0*	147.0**
Turbo-generators (thousands kw.) . .	99.6	707.0
Hydro-generators (thousands kw.) . .	—	254.6
Other generators (thousands kw.) . .	10.6	79.4
Direct and alternating current generators (thousands kw.)	410.3	2,105.2**
Transformers (thousands kw.)	433.4	3,426.0

In 1931 the output of prime movers in the U.S.S.R. represented 45 per cent of the output of the United States in 1927 as the following table shows:

Type of prime movers	U.S.S.R. 1931	U.S.A. 1927
Steam turbines (thousands h.p.)	955	2,409
Diesels and other oil driven motors (thousands h.p.) . . .	277.2	367.5

The total capacity of prime movers produced in 1931 amounts to 1.3 million h.p., which is equal to 95 per cent of the total capacity of all the electric power stations in pre-revolutionary Russia including factory, municipal, railway, etc., power stations.

In order to characterize the qualitative changes that have taken place in the production of prime movers, it is necessary to note the increasing concentration of capacity in single units. Every large turbine of 50,000 kw. turned out by the Stalin Works is one and a half times greater in power than all the turbines turned out in 1928 put together (34,000 kw.). The production of Diesel engines of 3,250 h.p. has been mastered. The next thing on the order of the day is the manufacture of Diesel engines of

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* Figures for 1927.

** Figures for 1931; the figures for 1932 are not complete.

10,000 h.p. and more, intended for the purpose of taking the peak loads of electric power stations.

Still greater successes have been achieved in the electrical machinery industry. The electrical machinery industry fulfilled the Five-Year Plan in two and a half years. Its output increased five-fold in four years. In 1931 the Soviet electrical machinery industry occupied third place for volume of output after the United States and Germany.

There is a great difference between the structure of the electrical engineering industry in the U.S.S.R. and that in capitalist countries. Thus, in the electrical engineering industry in the United States the manufacture of machinery and apparatus represented 27.7 per cent of the total output in 1929 and 18.9 per cent in 1930, whereas in the Soviet electrical machinery industry the figures are 41.2 per cent in 1930 and 42 per cent in 1931.

A very considerable part of the output of the electrical engineering industry of the U.S.S.R., almost half, consists of equipment for power stations. This is a decisive and very complex section of the electrical machinery industry, and in this section very great progress has been made.

In 1929 the U.S.A. produced electric power generators of a total capacity of 3.2 million kw. The total power of the generators produced in the U.S.S.R. in 1932 is 1 million kw., *i.e.*, 31 per cent of the maximum output reached by the United States.

Like Soviet engineering generally, the electrical machinery industry has radically changed the character of its output during the Five-Year Plan period. From the first seven turbo-generators of an average power of 1,300 kw. manufactured in 1924, the industry passed in 1931 to the production of turbo-generators of 50,000 kw., and in 1932 the Electrosila Works turned out the largest hydro-generator in the world (62,000 kw.) for the Dnieper Power Station. The Kharkov Turbine Works, which is being started in the beginning of 1933, is equipped with powerful machine-tools and cranes which will permit of the production of generators of 160,000 kw. in a single unit.

In 1928 the Electrozavod produced transformers of 100 kv.a., in 1931 it produced transformers of 20,000 kv.a. and for a tension up to 150,000 volts, and in 1932 it produced similar transformers for 220,000 volt transmission lines.

In the first Five-Year Plan period the conveyor method of mass production of electric motors was introduced which, in addition to the radical improvement in the construction of the motors, has rendered it possible to reduce considerably the costs of production. The ability to produce electrical equipment for tractors and welding machines on a mass scale, the serial production of oil switches, mercury rectifiers, electric furnaces, electric cars, motors for drills, etc., has been acquired.

MACHINE-TOOLS AND TOOL MAKING

The Five-Year Plan laid special emphasis on the importance of machine-tool and tool production. "The development and the success of machine building will be impossible unless the production of metal and woodworking machines is first organized on the necessary scale. The economic and technical progress of machine construction is directly dependent upon it being properly equipped with machine-tools. Hence, the leading role of machine-tool production and tool making is clear." *(The Five-Year Plan,* Vol. II Part 1, p. 156.)

Machine-tool production on a large scale was created only during the Five-Year Plan period. Of the available machinery in the machine-tool section of the industry, according to the figures for April 1932, 70 per cent was installed during three and a quarter years of the Five-Year Plan period, and 83 per cent has been installed since the Revolution.

The old machine-tool works have been fundamentally reconstructed. In 1932 the first sections of two gigantic machine-tool works were started which have not their equal in a single capitalist country, namely, the Moscow Turret Lathe Works, which has an output capacity of 6,700 lathes per annum and the Gorky (Nizhni-Novgorod) Milling Machine Works, with an output capacity of 8,000 machine-tools per annum. A new drilling machine works is being erected in Kharkov.

The intensive growth in the number of available machine-tools in the U.S.S.R. is being based more and more on home production. According to the census of the equipment that has been taken over from pre-revolutionary Russia, only one-fourth of the machine-tools in use were of home production and three-fourths were imported. During the Five-Year Plan period a considerable change has taken place in the proportion between home produced and imported equipment. This is seen from the following table showing the sources from which metal cutting machines were obtained:

	Per cent of home produced machines	Per cent of imported machines
Prior to 1917	24	76
1928	34	66
1932 (1st quarter)	46	54

Of the equipment installed in 1932, Soviet-produced machine-tools represent almost half.

The task set by the Five-Year Plan—to satisfy requirements of the country in the most widely used machine-tools—has been solved in the main. The production of universal lathes during the Five-Year Plan period developed not only in regard to the quantity turned out. From the production of the most elementary types of universal lathes, the Soviet machine-tool industry passed to the production of modern and effective universal lathes. The production of up-to-date turning lathes and new types of drilling machines, surface planing machines, shapers, horizontal boring machines, etc., has been mastered. At the new machine-tool works in Moscow and Gorky, the production of turret lathes and milling machines is being organized.

The growth of the machine building industry called for the development of the tool making industry. During the Five-Year Plan period the old tool making works (the Pneumatic Works and the Voskov Works in Leningrad, the Moscow Tool Works, the Zlatoust Works, etc.) were reconstructed and enlarged. The first sections of two huge new works have been started in Moscow—the Calibre Works and Freser Works, only one of which was provided for in the Five-Year Plan. In addition to this, the output capacity of tool shops was increased by reconstructing a number of old works and by organizing special tool shops in a number of large new works (the Stalingrad Tractor Works, the Stalin Automobile Works in Moscow, etc.) which for their size, technique and organization are on a par with the best American tool shops. The manufacture of highly specialized types of instruments (multiple stage pneumatic instruments, Johansen plates, micrometers, thread micrometers, worm milling cutters), which formerly were entirely imported from abroad, has been mastered. The quality of the tools manufactured has been improved by the introduction of high-speed steel and super-hard alloys like "Vidia," "Pobedit," "Stalinit" and "Smena."

During the first Five-Year Plan period a new branch of industry has been created—the abrasive industry, which is closely connected with the mass production of precision instruments. Out of small, semi-artisan workshops in Leningrad and Luga (in the Leningrad region), modern works have grown. A new huge abrasive combine has been erected at Chelyabinsk which manufactures alund and carborundum and also alund and carborundum articles.

METALLURGICAL, MINING, OIL WELL AND CHEMICAL MACHINERY

The production of modern equipment for the metallurgical, oil, coal, peat and chemical industries was organized almost entirely during the Five-Year Plan period. The output of the specialized enterprises for the production of heavy machinery during these years increased 3.7 times and in 1932 reached in value the total of 375 million rubles (calculated at the prices prevailing in 1926-27).

These figures, however, do not completely reflect the real dimensions and growth of the output of equipment for the metallurgical, oil, coal, peat and chemical industries because, in addition to the specialized works, a large number of other engineering works in the U.S.S.R. were utilized for the purpose of supplying equipment to these branches of industry during the past few years.

During the Five-Year Plan period, the Soviet works have learned to produce the main types of mining and metallurgical equipment—from drills and mechanical picks for coal and ore mines, to turbo-blowers, pig casting (ladling) machines and blooming mills; from boring equipment to complicated apparatus for oil cracking and for distillation plant equipment. The chemical machinery industry has learned to produce acid and alkali resisting apparatus and equipment for high pressure and high temperature processes.

The place held by heavy machinery works in regard to the quantity of new equipment used at the end of the first Five-Year Plan period is seen from the following: in 1931 they took 5.5 per cent of the newly installed metal working machinery; in the first quarter of 1932 they took 7 per cent; and of the total number of machine-tools being installed or on the way to the works in the first quarter of 1932, they took 30 per cent.

Special importance for the whole of national economy is attached to the starting in 1933 of the Sverdlovsk Works, part of which is already working, and the Kramatorsk Works. Both these works are to produce heavy machinery; the first with a capacity of 100,000 tons of machinery per annum and the second —150,000 tons. They are equipped with powerful presses of 3,000, 6,000 and 10,000 tons. These two works, for size and technical equipment, have not their equal in any capitalist country.

The average power of the metal cutting machines installed in the machine shop of the Sverdlovsk Works is 14.5 h.p. and in the new Kramatorsk Works it is 15 h.p., whereas the average power of the machine-tools in the old Kramatorsk Works, one of the biggest of the old heavy engineering works in the U.S.S.R., is 8.8 h.p.

When the Sverdlovsk and new Kramatorsk Works will work at their full capacity, and when the old heavy machinery works are reconstructed, the overwhelming majority of the machines required by the metallurgical and oil and coal industries to fulfil their plans of output laid down by the second Five-Year Plan will be supplied by the U.S.S.R.

TRANSPORT EQUIPMENT

During the Five-Year Plan period a powerful industry has been set up for the mass production of automobiles on the conveyor system. The Molotov Automobile Works in Gorky, which was started at the beginning of 1932, and the Stalin Automobile Works in Moscow, which was started at the end of 1931—the two biggest automobile works in Europe—turned out 22,800 cars already in the first half year of their work (1932).

The output of automobiles in the U.S.S.R. in the period from 1927 to 1932 is shown in the following table, which however does not include cars assembled from imported parts:

Name of Works	1927-28	1928-29	1929-30	1931	1932
Stalin Works	586	1,100	2,590	2,831	15,149
Molotov Works	—	—	—	—	7,697
Yaroslavl Works	91	208	646	1,114	1,219

A distinguishing feature of the Soviet automobile industry is the large proportion of trucks that are turned out. This is to be explained by the necessity of serving primarily the requirements of goods transport of the country. If used to their full capacity, the Soviet automobile works now in operation can produce approximately as many trucks as were produced in 1929 by all the automobile works in Europe put together.

The output of railway equipment has increased to a considerable extent during the Five-Year Plan period. The following table shows the output of rolling stock in 1927-28 and 1932. The figures also include the output of freight cars produced in the works under the People's Commissariat of Transport.

	1927-28	1932
Locomotives (for main lines)	479	827
Freight cars (reduced to 2 axle calculation)	9,130	21,612
Passenger cars (including cars on electric railways) . .	275	1,074
Tramcars	468	974

The reconstruction of railway transport called for the production of a more powerful type of rolling stock. The output of 16-ton freight cars has been stopped and the freight carrying capacity of the two-axle cars has been increased to 20-25 tons and that of the four-axle cars to 50-70 tons. Heavy freight cars (four-axle) in 1932 represented 57 per cent of the total number of cars produced in that year and 62 per cent of the total freight capacity calculated according to the number of axles.

The increase in the transport of oil products caused by the mechanization of agriculture and the growth of automobile transport, the increase in the transport of ore, coal and building materials, and the higher demands for supplies, which the rapidly growing industrial centres are making upon the transport system, have given rise to the considerable development of the production of special cars and self-unloading cars. The extent to which this item has grown can be seen from the following table:

	1927-28	1932
Refrigerator cars (4-axle)	—	1,465
Oil cisterns (4-axle)	499	2,504
Oil cisterns (2-axle)	—	638
Self-unloading cars (4-axle)	—	1,250
Self-unloading cars (2-axle)	—	1,451

In 1932 special cars represented 68 per cent of the total output of cars calculated according to the number of axles.

During the Five-Year Plan period, locomotives belonging to series E and SU were greatly improved and their hauling power was increased by approximately 10 per cent. In 1931 and 1932 the first extra powerful FD freight locomotives, having a 20-ton pressure per axle, and also the JS passenger locomotives, were turned out.

The construction of new locomotive and car works during the first Five-Year Plan period and the reconstruction of the old railway works that is still going on will make it possible in the second Five-Year Plan period greatly to increase the output of railway rolling stock.

In 1933 the new Lugansk Locomotive Works starts operation. These works have an estimated output capacity of 1,080 FD locomotives per annum. Calculated in terms of the hauling power of E locomotives, this is equal to double the output of freight locomotives in 1932.

In Novo-Cherkask a new locomotive works is being put up to manufacture locomotives for internal industrial transport. In Orsk a steam and Diesel locomotive plant is being built. The Kolomna Works, which has already manufactured several models of Diesel locomotives, is preparing for the serial manufacture of this new type of locomotive intended for the arid regions of the U.S.S.R. In 1933 a new electric locomotive shop will be started at the Dynamo Works, which will serve as the base for the serial manufacture of these locomotives (up to 100 per annum).

A huge new electric locomotive works is being put up at Kashira, which was not included in the Five-Year Plan.

A huge railway car combine is being constructed at Taguil, and a new railway passenger car factory is being built in Kazan.

At the end of 1933 new works are to be started for the manufacture of cast-iron wheels, and shops for the manufacture of cast-bogies, automatic couplings, and a forge shop are to be started at the Nizhni Taguil Railway Car Combine and a new steel foundry is to be started at Bezhitsa, which will remove the shortage of bogies and wheels which at the present time restricts the output of cars, and will guarantee the supply of automatic couplings for the modernization of the existing rolling stock.

The Voronezh Works, which are to produce automatic signalling equipment, which is of the utmost importance for increasing the carrying capacity of the railways, is nearing completion. These works, in conjunction with the Kozitsky Works in Leningrad, which has already mastered the production of automatic signalling apparatus, will be able to meet all the requirements of the railway transport system in the second Five-Year Plan period.

During the first Five-Year Plan period a powerful ship-building industry has developed. Compared with 1927-28, the output of the Soviet shipyards in 1932 increased 3.5 times.

During four years of the Five-Year Plan period, the maritime shipyards built 86 mercantile ships ranging from 1,000 tons displacement (trawlers) to 18,700 tons displacement (oil-driven tankers). Notwithstanding all the assistance and encouragement the pre-revolutionary ship-building industry in Russia received from the tsarist government, only 9 maritime mercantile vessels left the yards in the period of 1905-17 with a maximum displacement of 3,800 tons. The total tonnage constructed in the Soviet Union during the Five-Year Plan period exceeds 200,000 tons, which is eight times more than was produced in the shipyards in tsarist Russia in thirteen years.

New types of Soviet maritime vessels have been created and the serial output of motor refrigerators has been commenced with a carrying capacity of 2,400 and 3,200 tons, fast oil-driven passenger boats, with a capacity of 550 passengers, oil tankers of 7,500 and 10,000 tons, oil-driven freighters of 6,500 tons and lumber carriers of 5,500 tons.

The building of river steamers, (passenger boats and tugs), which was very insignificant in the years preceding the Five-Year Plan period, was raised in 1932 to 87 units with a total of 18,900 indicated h.p.

The fixed capital of the enterprises engaged in building river steamers, the Rechsoyuzverf (River Shipyard Combine) increased from 18.9 million rubles on January 1, 1931, to 48.3 million on January 1, 1933. The river shipyards have undergone radical reconstruction. Seventy-one per cent of their metal working machinery in operation at the beginning of 1932 was installed in the years of the Revolution and 50 per cent of their machine-tools was installed, during the first three years of the Five-Year Plan period.

The time for the building of the hulls of maritime ships, which only a few years ago took from ten to eighteen months, has been reduced to six or seven months and for that of those of trawlers to three months. The installation of engines in an assembled form has made it possible to reduce the period of the completion of the vessel ready for launching to two or three months. Formerly, it often took two and a half years.

Electric welding is now being extensively employed in shipbuilding and this has greatly accelerated the course and lowered the cost of production.

AGRICULTURAL MACHINERY

The production of agricultural machinery is more developed in the Soviet Union than in any other country in the world. In April 1932, there were 14,500 machine-tools in operation in the agricultural machinery industry in the U.S.S.R. which is 2,300 more than the number employed in that industry in the United States in 1930. Two-thirds of the machine-tools employed in the agricultural machinery industry in the U.S.S.R. were installed in the first three years of the Five-Year Plan period. The output of agricultural machinery (including tractor production) in the U.S.S.R. from 1927-28 to 1932, compared with 1913, is shown in the following table:

	1913	1927	1929	1930	1931	1932
Output in millions of rubles in prices of 1926-27	55.0	161.0	270.1	452.8	730.9	890.4
Per cent of 1913 . .	*100.0*	*292.7*	*491.1*	*823.3*	*1,328.9*	*1,618.9*
Per cent of 1927-28	—	*100.0*	*167.8*	*281.2*	*454.0*	*553.0*

The output of agricultural machinery during the Five-Year Plan period increased more than five and a half times. The production of agricultural machinery is concentrated in forty-eight enterprises, the output of which in 1932 was more than sixteen times the output of the 722 enterprises producing agricultural machinery in pre-revolutionary Russia.

During the Five-Year Plan period, the character of the agricultural machinery produced underwent a fundamental change. From the production of implements for the use of small peasant farming, the industry passed to the production of implements for the technical re-equipment of agriculture conducted on a larger scale than anywhere else in the world.

The production of tractors rose from 874 in 1927 to 50,000 in 1932. The full output capacity of the tractor works now in operation (excluding the Red Putilov Works) is equal to 100,000 tractors per annum with a total of 1.5 million h.p. In 1933, the first section of the Chelyabinsk Caterpillar Tractor Works is being started. When this plant is completed, it will have a capacity of 40,000 tractors with a total of 2 million h.p. per annum.

The proportion of agricultural machines of mechanical traction to the total output of the agricultural machinery industry (not including tractors) was 2.6 per cent in 1927-28. In 1932 this rose to 84 per cent.

The mass production of harvester combines has been mastered and from 347 units in 1930, the output has been raised to 10,000 in 1932. The three combine works now in operation, when working at full load, and when their output capacity will be fully mastered, will be able to produce 40,000 combines, which exceeds the maximum output of the United States in 1929, which was 36,900.

During the past two or three years, the mass and serial production of new implements for the mechanization of highly labour absorbing processes in the cultivation of technical and rotation crops, *e.g.*, cotton and corn sowing machines, potato planting machines, beet diggers, beet harvesters, potato diggers, corn pickers, flax pulling machines, cotton picking machines, etc. The production of hay mowing and stock-breeding equipment has also been mastered.

The mastering of a large number of new types, forms and constructions of agricultural machines helped to train cadres of skilled constructors. Technical experience has been acquired which will enable us rapidly to construct and put into operation the most modern types of machines for socialist agriculture.

EQUIPMENT FOR THE LIGHT AND FOOD INDUSTRIES

The enterprises producing equipment for the light and food industries developed very quickly in the first Five-Year Plan period. This is shown in the following table which gives the figures for the various organizations producing these types of machinery for light industry (in thousands of rubles at prices prevailing in 1926-27):

	1927-28	1932	Per cent of increase
Textile Machinery	26,066	71,403	*273.9*
Boot and Shoe Machinery	1,950	10,665	*546.9*
Food Industry Machinery	16.678	60,770	*364.4*

During the Five-Year Plan period the enterprises in these organizations specialized on definite types of machines which made it possible to organize large serial production of equipment for the light and food industries. A large quantity of machinery for the light and food industries (particularly for the sugar industry) is produced in enterprises controlled by other industrial organizations.

In view of the creation of a home raw material base for the light and food industries, special attention was devoted in the first Five-Year Plan period to the organization of the production of equipment, never before produced in the U.S.S.R., for the primary working up of agricultural produce (for cotton ginning mills, flax mills, silk winding mills, flour mills, vegetable preserving factories and meat packing plants) and also for the storage of produce (elevators and cold storage plants).

The machine building industry has mastered the art of manufacturing all items of equipment for the cotton industry, from improved machines for the primary handling of cotton fibre to ring spindles. The Soviet enterprises are now turning out wool-washing and retting machines, wool-combing apparatus (two and three combings), twisting machines, looms and finishing machines for the woollen industry. For the bast fibre industry the manufacture of high-speed ring spindles and weaving looms has been mastered. The manufacture of complex machinery for the knit goods industry (tubular knitting automatics, stocking automatics, etc.) has also been organized. Similarly, the serial output of leather and complex boot and shoe machinery has been organized. Before the Five-Year Plan period, Soviet factories never manufactured sewing machines of an industrial type; only so-called domestic machines were manufactured. During the first Five-Year Plan period, the serial output of special sewing machines of high speed (2,000 to 2,200 revolutions per minute) for the clothing industry and boot and shoe industry has been organized, and the output of complex sewing machines for the knit goods industry (of 3,000 revolutions per minute) is being mastered.

In 1932 the production of rotary printing presses, linotypes and bookbinding machines was organized. During the first Five-Year Plan period the production of equipment for the food industry increased almost four-fold. The newly built mechanical bakeries, flour mills and oil presses, elevators and food preserving factories were equipped with machinery mainly of Soviet manufacture. In view of the rapid growth of public catering, the mass production of equipment for factory kitchens and mechanized dining rooms was organized for the first time.

* * *

The enormous work of construction carried out in the engineering industry during the Five-Year Plan period, and the creation of a powerful base for the heavy industry, both ferrous and non-ferrous metals, secured the development of Soviet machine building on a scale that transformed this formerly backward industry into the leading branch of national economy, mighty in its technical equipment and productive capacity.

The gigantic sweep of development of Soviet engineering during the years of the first Five-Year Plan period guaranteed the rapid increase in the technical equipment of all branches of national economy and created a material base for the solution of the problems of reconstructing industry, transport and agriculture in the second Five-Year Plan period.

ELECTRIFICATION

THE socialist industrialization of the country and the development of the productive forces based on it could be achieved only by laying down a new technical base for the entire economy of the country—the base of electrification. Therefore the first plan for the industrial restoration and reconstruction of the economy of the country was the plan of electrification. It was the State Plan for the Electrification of Russia *(Goelro)*, elaborated under the guidance of Lenin. The plan provided for the construction, in the course of ten to fifteen years, of thirty large power stations, with a total capacity of 1.7 million kw. in various parts of the country. The completion of the *Goelro* plan was taken as a basis in the elaboration of the first Five-Year Plan for the electrification of the country.

The electric power base of pre-revolutionary Russia was poor in every respect. The capacity of all the power stations on the territory of what is now the Soviet Union amounted to 1,098,000 kw. in 1913, with an annual output of 1,945 million kw. h. With the exception of a few comparatively large power stations in Leningrad, Moscow and Baku, all the other stations were small and equipped with small and wasteful prime movers. Fuel for the power stations in pre-revolutionary Russia had to be carried across long distances and consisted mainly of oil and of British and Donets coal. The water power resources of the country were practically not utilized at all.

During the imperialist and civil war, the weak electrical base was to a large extent destroyed. By 1921, when the Soviet Government passed on to the work of peace time industrial construction, the electric power industry was in a very critical situation.

By the beginning of the first Five-Year Plan period, the Soviet Union had already attained considerable successes in carrying out the *Goelro* electrification plan, and by the end of 1928 the capacity of all the power stations reached 1,874,000 kw. and the annual output was 5 billion kw. h.; the old power stations were radically reconstructed and enlarged, and the first important district power stations came into operation. In the course of the first Five-Year Plan period, the capacity of the power stations and their output increased as follows:

							1932 in percentage to	
Years:	1913	1928	1929	1930	1931	1932	1913	1928
Capacity of power stations in thous. kw.*	1,098	1,874	2,344	2,894	3,878	4,567	*415.9*	*243.7*
Of which: district stations	170	610	809	1,170	2,080	2,624	*1,543.5*	*430.2*
Output in millions of kw.h. by all stations	1,945	5,003	6,386	8,231	10,453	13,100	*673.5*	*261.8*
Of which: district stations	431	1,950	2,475	3,737	5,540	7,895	*1,831.9*	*404.9*
Proportion of district stations in per cent to total .								
a) Capacity .	*15.5*	*32.5*	*34.5*	*40.2*	*53.6*	*57.5*		
b) Output . . .	*22.2*	*38.9*	*38.8*	*45.4*	*53.0*	*60.3*		

Thus the installed capacity of all the power stations in the Soviet Union increased 2.4 times in the course of four years of the Five-Year Plan, whereas the output of energy increased 2.6 times, which means an annual increase of 27 per cent. In the U.S.A. the output of energy by the public utility stations declined from 97 billion kw.h. in 1929 to 84 billion kw.h. in 1932.** In the course of these four years, the capacity of the district power stations in the Soviet Union increased 4.3 times, while the proportion of the capacity of the district stations to the total installed capacity of all the stations in the U.S.S.R. increased from 32.5 per cent in 1928 to 57.5 per cent in 1932. In the course of the four years, the amount of electric power produced by the district stations increased four times while the total output of the Union increased 2.6 times. In consequence, the proportion of the output of the district power stations to the total output of the Union has risen from 38.9 per cent to 60.3 per cent. The *Goelro* plan which provided for the construction of thirty district stations with a total capacity of 1.7 million kw. was overfulfilled as early as 1931 when the capacity of the district stations exceeded 2 million kw.

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* The figures of capacity and output do not include temporary power stations at large works in construction.

** *Electrical World,* No. 1, 1933.

In 1928, there were eighteen district stations in the U.S.S.R. with a total capacity of 610,000 kw. The average capacity of the stations was 34,000 kw. By the end of 1932, forty-three district stations were working with a total capacity of 2,624,000 kw. and an average capacity of 61,000 kw. By the beginning of 1929, there was not a single station in the U.S.S.R. with a capacity of 100,000 kw. Now there are ten stations in the U.S.S.R. with a capacity of 100,000 kw. and over, stations which, in the course of the first Five-Year Plan period, were newly built or radically reconstructed to increase their capacity.

District	Name of power station	Source of power	Capacity in 1928	Capacity in 1932	Total projected capacity
Moscow region	Kashira	Moscow coal	12	186	186
Moscow region	Shatura	Peat	92	136	180
Moscow region	Moges I	Crude oil	75.5	107	119
Leningrad	Krassny Oktyabr	Peat	20	111	111
Donbas	Shterovka	Anthracite slack	20	157	157
Donbas	Zuevka	Anthracite slack	—	150	250
Dnieper region	Dnieproges	Water power	—	310	558
Gorky	Gorgres	Peat	20	158	204
Urals	Chelyabinsk	Brown coal	—	100	150
Baku	Krassnaya Zvezda	Crude oil	82	109	133

In 1932, these ten electrical giants produced 33 per cent of the total output of electric power.

Thus the concentration of capacity and output in big district stations, the main idea underlying the *Goelro* plan, was realized by the electrical construction accomplished during the Five-Year Plan period.

The building of new power stations was accompanied by the use of more powerful and more up-to-date installation. Prior to the Five-Year Plan period, the generally adopted unit at district stations was a turbo-generator of 10,000 kw. At the beginning of the Five-Year Plan period, the Soviet Union, in its electric power station construction, began to use units of 24,000 kw. extensively and by the end of the Five-Year Plan period, the typical unit at large power stations was a turbo-generator of 50,000 kw.

The following table shows the proportion of powerful turbines to the general installation in the district stations:

Year	Units with capacity Up to 10 thous. kw. (In percentages)	From 10 to 24 thous. kw. (In percentages)	From 25 thous. kw. and upwards (In percentages)
1924	*100.0*	—	—
1928	*68.5*	*19.4*	*12.1*
1931	*27.6*	*42.1*	*30.3*

The indices of steam pressure in boilers at electric power stations give a similar picture. Prior to the Five-Year Plan period, in boiler units of the district stations, the pressure as a rule was 13-18 atmospheres; pressure of 30 atmospheres was not applied. By the end of the Five-Year Plan period, pressure of 33 atmospheres was a most general feature at the large district stations, and some of the central heat and power stations were using pressures of 60 atmospheres and over.

The planning of the electrification of the U.S.S.R., which is concentrating the power supply of industry at the big district stations, necessarily limits the need for the building of special power stations at factories. The building of such power stations is permitted only in such districts where for technical reasons power is not available from district stations; in such cases, the power stations at the factories are as a rule built with a view to combining the output of electric and heat power (central heat and power stations) and also with a view to supplying power to the neighbouring enterprises and settlements.

The building of central heat and power plants is a characteristic feature of the industrial construction of the first Five-Year Plan period.

The power base in a number of branches of industry, such as textile, chemistry, paper, machine building, etc., was reconstructed by means of building large central heat and power plants. The total capacity of the central heat and power plants rose from 55,000 kw. in 1928 to 300,000 kw. in 1933.

For the purpose of supplying electric power to the new giant metallurgical works, large power stations were built such as Magnitogorsk with a capacity of 48,000 kw. which will ultimately be raised to 248,000 kw., Kuznetsk with a capacity of 36,000 kw. to be raised ultimately to 108,000 kw. and a number of others. These stations are now in operation; they were built with a view to having their capacity included in the general circuit and thus, by their dimensions and the character of their consumers, they are virtually district stations.

The supply of current from big district stations to industrial enterprises offered the possibility of closing down and partly dismantling a large number of small antiquated power stations at factories which were using wasteful units and burning high quality fuel. This process was most intense in the Donbas, in the Dnieper region and in the Moscow, Leningrad and Ivanovo industrial regions where a powerful base of electric supply had been created.

As a result of the policy of centralizing the supply of power, the whole structure of the electrical base of the industry has radically changed in the course of the Five-Year Plan period. Prior to the Revolution, in 1913, practically all the electric power required by the industries of the country was produced by electric power stations installed at the works, and only 15 per cent was obtained from public utility power stations. In 1928 the proportion of electric power supplied to the industry from district stations was 37.5 per cent and in 1932 it rose to 65 per cent, which marks the high technical level of the electric power industry of the country.

As a result of this policy of centralizing the power supply for industry, the increase in the capacity of the power stations at the works during the first Five-Year Plan period was considerably less than the increase of the capacity of the district stations. The former stations increased their capacity from 900,000 kw. in 1928 to 1,338,000 kw. in 1932, *i.e.*, 1.5 times as compared with 4.3 times, the increase in the capacity of the district stations. At the same time the type of electric power station installed at works had radically changed; the proportion of large stations equipped with modern units is now higher whereas the proportion of old, small installations has been considerably reduced.

Apart from the district stations a number of smaller electric power stations for general supply (municipal, etc.) were built during the first Five-Year Plan period and the capacity of the stations of this type increased from 298,000 kw. in 1928 to 501,000 kw. in 1932, *i.e.*, by 68 per cent.

Thus, by the end of the first Five-Year Plan period the greater number of the power stations in the U.S.S.R. were public utility stations, and the proportion of the special stations declined.

	1928		1932	
	In thous. kw	Per cent of total	In thous. kw.	Per cent of total
Public utility (district, municipal, agricultural) stations	908.0	*48.5*	3,125.4	*68.4*
Special (industrial, railroad) stations	966	*51.5*	1,441.6	*31.6*

The rapid pace of building electric power stations made it possible to consolidate and extend the bases of electric power supply in the old industrial regions and at the same time gave the possibility of creating a new base of power supply for the development of new industrial regions.

As a result of the first Five-Year Plan, in Moscow and Leningrad, in addition to the radical reconstruction and extension of the old city stations, new powerful electric power stations using local fuel were built, thus making these districts less dependent upon fuel coming over long distances: at Leningrad, Krassny Oktyabr (working on peat) was built, with a capacity of 111,000 kw., also the Dubrovka and the Svir which will enter into exploitation in 1933, the first working on peat with a capacity of 100,000 kw., the Svir hydro-electric station, with a capacity of 96,000 kw.; in the Moscow district, extensions were made at the Shatura power station whose capacity has been brought up to 136,000 kw., and will be further increased in 1933 to 180,000 kw. (this station also uses peat); the Kashira power station was built with a capacity of 186,000 kw. (it works on Moscow coal) and the Bobriki power station is being completed, with a capacity of 100,000 kw. (on Moscow coal). Some of the old city stations have been re-equipped and reconstructed as central heat and power stations.

The Gorky and Ivanovo industrial regions now have three large power stations using peat: the Gorky power station with 158,000 kw. will be enlarged in 1933 to reach 204,000 kw., the Ivanovo power station, with 72,000 kw., the Yaroslavl power station, with 36,000 kw. All the stations are linked up forming a one ring system. In the industrial centres of the Volga, large district stations using Donets coal and slack were built (the Kazan central power and heat station, the Saratov, Samara and Stalingrad electric power stations).

For the purpose of providing the coal, metallurgical, machinery and chemical industries in the North Urals with electric power, the Berezniki and the Kizel power stations were built in the Urals. The first is a large central power and heat station installed at the Berezniki chemical combine, with a capacity of 93,000 kw.; it will supply the chemical combine with steam, and transmit electric power to the combine as well as to the general net of the North Urals; the second, the Kizel power station, was built with a projected capacity of 100,000 kw., producing 26,000 kw. at present. The Kizel and Berezniki stations are inter-connected and, by a high voltage transmission line, are transmitting energy to a vast district, right up to Perm and Upper Tura. The South and Central Urals obtain their electric power from the powerful Chelyabinsk electric power station which was built during the first Five-Year Plan period, and now produces 100,000 kw., but after some extension its capacity will be increased to 150,000 kw. by 1935.This station is using the Chelyabinsk lignite and, besides supplying the Chelyabinsk district, is also transmitting power to the district of Sverdlovsk at a distance of over 200 kilometres.

One of the most brilliant successes achieved in electrification in the course of the first Five-Year Plan period is the radical solution of the problem of supplying the Donbas with electric power. In the Five-Year Plan Donbas was considered to be the most difficult section, not only in the Ukraine, but in the whole Union, in regard to the supply of electric power. In 1928 the Donets Basin was supplied with electric power by a large number of small stations installed at the mines, works and factories. These stations were burning high-grade coal and supplied expensive and unreliable power. The total capacity of the power stations in Donbas was 180,000 kw. The backwardness of the electric power stations was a menace hindering the rapid development of the coal and metallurgical industries of the Donbas.

In spite of the attempts on the part of the wreckers to hamper the organization of the electric power base in the Donbas, the Soviet Government, by adopting resolute measures, succeeded by 1931 in ensuring the electric power supply of the Donbas. With the starting of the Zuevka electric power station (first stage—150,000 kw.), of the Shterovka (157,000 kw.), both of them using anthracite slack, as well as of the central heat and power station of the Donsoda (70,000 kw.), the total capacity of the Donbas power stations reached 630,000 kw. Of this capacity 60 per cent was installed at central electric power stations, excellently equipped, using coal waste and supplying cheap power. All the stations are interconnected and transmit energy over a ramified system of electric transmission lines.

The erection of the Dnieproges,* the greatest hydro-electric station in the world, with a capacity of 558,000 kw. (of which on January 1, 1933 310,000 were in exploitation), was a model combination of the skill of Soviet engineering with up-to-date foreign technique and socialist organization of labour. This station forms the groundwork for the development of gigantic combines of the electrical and metallurgical industries (aluminium, ferro-alloys, electric steel, etc.). The Dnieproges supplies a large industrial region with electric power over high voltage transmission lines, and within the very near future will be linked up by a transmission line with the Donbas, and thus a gigantic system of power stations with a total capacity of 1.5 million kw. will have been created.

Apart from the stations enumerated above, a considerable number of district stations in new industrial regions of the Union were built in the course of the first Five-Year Plan period and are either running, or will be put into operation in 1933. These are the Dzoraget hydro-electric stations with a capacity of 22,000 kw. in Transcaucasia, the Rion hydro-electric station with a capacity of 48,000 kw., also in Transcaucasia; the Kadyr hydro-electric station with a capacity of 12,000 kw. in Central Asia; Kemerovo station with a capacity of 48,000 kw. in West Siberia; Briansk station with a capacity of 22,000 kw. in the Western Region; the Voronezh power station of 48,000 kw. in the Central Black Earth Region, and a number of others.

The building of district high voltage interconnecting systems was the most important part of the electric power building program of the first Five-Year Plan. The great high voltage system linking up over 500,000 kw. of the Moscow power stations, the linking up of the power stations of the Ivanovo and Gorky regions for a distance of over 300 km., the ramified power system of the Donbas, the transmission lines of the Dnieproges, with 161,000 voltage, the Svir-Leningrad line, which will enter into operation in 1933, 240 km. long, with a 220,000 voltage—such stations were quite unknown before the first Five-Year Plan period and are not inferior to the greatest models of American technique.

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* Generally known as Dnieprostroy—the name of this station during the time of construction.

Altogether in the course of the Five-Year Plan period, 7,000 km. of high voltage transmission lines were operating with a voltage of 22,000 and over, while at the beginning of the Five-Year Plan period there were only 3,000 km. of such transmission lines.

In order to rationalize the fuel balance sheet of the U.S.S.R. and reduce to the utmost the consumption of fuel which has to be carried over long distances, the new electric power stations are built with a view to their being fed on local power resources. The problem of burning peat, both milled and bricketed, anthracite slack, Moscow coal, Chelyabinsk lignite, the waste of the Donets, Kizel and Kuznetsk coals and a number of other low-grade varieties of fuel, was solved as a result of scientific research and construction work.

The U.S.S.R. now occupies the first place in the amount of peat consumed at the large power stations as well as in the technique of burning peat. Likewise, it occupies the first place in burning anthracite slack in a pulverized state.

Accordingly, the proportion of the different varieties of fuel to the total consumption underwent great changes, as may be seen from the following table:

	In per cent to the total		
Sources of energy	1913	1927	1932
Oil	60	34.5	17.3
Coal brought from other districts	40	26.5	18.7
Total of fuel brought from other districts	100	61.0	36.0
Peat	—	21.5	20.95
Wood	—	4.2	2.9
Local coal	—	4.1	30.75
Miscellaneous	—	—	1.0
Total local fuel	—	29.8	55.6
Water power	—	9.2	8.4*
Total	100	100	100

* Dnieproges started working only at the end of 1932 and its effect in sharply increasing the proportion of water power will be reflected in the figures for 1933.

Thus the proportion of fuel carried over long distances which in 1913 represented 100 per cent in the electric power industry and in 1927, 61 per cent, declined by the end of the Five-Year Plan period to 36 per cent. And at the same time the proportion of local coal and coal waste, which is now the basic fuel consumed by the district stations, has sharply increased.

The progress made in the utilization of water power is especially great. By the beginning of the first Five-Year Plan period, the hydro-electric stations in the U.S.S.R. represented 112,000 kw. of which 72,800 kw. came from the district stations (Volkhov and Transcaucasia). By the beginning of 1933 the exploited capacity of the hydro-electric stations reached 437,000 kw. The Lenin Dnieper hydro-electric station with its projected capacity of 558,000 kw. and an annual output of 2.7 billion kw. h., which was put into operation in 1932, is the greatest hydro-electric station built during the Five-Year Plan period. The building of this station shows the advantages of the combined utilization by the Soviet Union, according to plan, of the water power reserves of the country. The Dnieper dam, which offers the possibility of tremendous output of cheap electric power at a cost of 0.7 kopeks per one kw. h., at the same time creates the possibility of uninterrupted navigation throughout the Dnieper. Apart from this the seasonal surplus of electric power will be utilized for the irrigation of the adjoining steppes. On the basis of a single plan, industrial combines which are great consumers of electric power are created in co-ordination with the hydro-electric stations and are built in their immediate proximity. This puts the use of electric power to the greatest effect and economizes capital investments.

Apart from Dnieproges, a number of large hydro-electric stations were built during the first Five-Year Plan period and will start working in 1933. These are the Svir station—96,000 kw., Rion—48,000 kw., Dzoraget—22,000 kw.; second stage of the Transcaucasian station, etc.

The experience accumulated in the course of the first Five-Year Plan period in the building of huge hydro-electric stations offered the possibility of starting at the beginning of the second Five-Year Plan period on still greater works in connection with the building of hydro-electric stations on the Middle Volga (Gorky, Yaroslavl) and on the Kama (Perm).

The U.S.S.R. passed to the building of electric units on a larger and technically higher level, and gradually has mastered the working of these units, which resulted in improvements in the efficiency of the power stations, particularly in the matter of economizing fuel. The expenditure of fuel per kw.h. produced at the district stations was reduced from 0.82 kilogram * in 1928 to 0.715 kilogram in 1932. The corresponding indices for the public utility stations in 1929 were 0.78 for the U.S.A. and 0.92 for England. Some Soviet stations show still more satisfactory indices; thus, the Ivanovo power station shows 0.63, the Kashira—0.68, etc.

The realization of the principles of centralized supply and planned regulation of consumption of electric power resulted in considerable successes also in the intensive exploitation of the capacity of the power stations as may be seen from the following data:

	1927	1928	1929	1930	1931	1932
Number of hours of exploitation of the average installed capacity of district power stations . .	3,090	3,610	3,750	3,750	3,920	3,570

The exploitation of the capacity in 1932 was somewhat lower as compared with the figures of the previous years owing to the fact that new hydro-electric stations were started and were not fully used, and also in view of the fact that some capacities in some districts were kept in reserve. If we exclude Dnieproges, the exploitation of capacity rises to 3,720 hours per annum.

Compared with the technically and economically advanced capitalist countries the capacity of the electric power stations of the Soviet Union is exploited one and a half or two times more effectively. In the U.S.A. the exploitation of the public utility power stations declined from 3,047 hours in 1929 to 2,286 in 1932; in Germany the exploitation amounted to 1,800 hours in 1931 and in England to 1,643 hours in 1928.**

The most developed electric power systems of the U.S.S.R. make a still more efficient use of the installation of the electric power stations. Thus, the power stations of the Moscow ring showed 4,560 exploitation hours in 1932, the Leningrad ring—4,770.

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* 1 kg.=7,000 calories.

** *Die Energiewirtschaft der Welt, Sonderheft, Institut für Konjunkturforschung*, Berlin. *Electrical World 1932-33. Wirtschaft u. Statistik*, 1933, No. 1.

The rapid development of power station construction was achieved with the aid of the latest methods of building and installing power stations. A number of large district stations were built within time limits beating all records for this type of construction. The Stalingrad power station, for instance, was built in a year and three months, the Dnieper power station was completed in less than five years, and two years earlier than the time limit set by the American consulting engineers.

The wide development of electrification in all the branches of the economy of the country, and particularly in industry, caused an exceptionally rapid increase in the consumption of electric power, and in the course of the Five-Year Plan period, the proportion of electric power consumed by industry was continually rising. Whereas the general increase in the development of industries during the first Five-Year Plan period was 218.5 per cent, the increase in consumption of electric power by industry was 242 per cent in 1932 as compared with 1928.

The great increase in the consumption of electric power by industry during the first Five-Year Plan period is evidence of the enormous progress made in reconstruction in regard to the technical equipment of industry, particularly in the matter of replacing mechanical drive by electric drive and in the development of the electrical industries. At all the new enterprises built during the first Five-Year Plan period, the working machines are electrified to the utmost degree in line with up-to-date world technique. The reconstruction of old enterprises was always accompanied by the replacement of mechanical transmission by electric drive. In consequence, the electrification indices of the industrial processes rose rapidly during the first Five-Year Plan period.

The proportion of electric power consumed in industry for mechanical needs to the total energy consumed for these purposes:

Electrification index	1913	1928	1929	1930	1931	1932
(In per cent) . . .	40	50.9	56	66	66.6	71.2

The capacity of the electric prime movers installed in industry rose from 1,691,800 kw. in 1928 to 2,904,000 kw. in 1931. The electrification of the machine-tools was accompanied ever more and more by the introduction of individual drive in industry. In the machine building industry 40.4 per cent of all the machine-tools are provided with an individual and multi-motor drive, in the automobile and tractor industry 82 per cent of all the benches are provided with individual drive.

Electrification extended not only to the motive power but to a considerable degree also to the technological processes. The consumption of electric power in technological processes amounted to 83 million kw.h. in 1928 or 2.5 per cent of the total consumption of electric power, and in 1931 it rose to 334 million kw.h. or 4.7 per cent of the total consumption of electric power. In 1932, with the bringing into operation of a number of new enterprises which are great consumers of electric power, the consumption of electric power in technological processes increased still further.

The electrification of the industry offered the possibility of solving a number of most important technical problems in the course of the first Five-Year Plan period, problems without the solution of which the present rapid pace of industrial development would be impossible. These problems were the mechanization of a number of highly labour absorbing industries, particularly the coal industry; the mechanization of all the main operations at the metallurgical works; the introduction of the conveyor system in the machine building industry; the organization of the manufacturing of ferro-alloys, of high-grade steel, aluminium, etc. All these problems could be solved only by a thorough electrification of the manufacturing processes in industry.

Along with the rapid process of electrification of industry during the first Five-Year Plan period, the other branches of the national economy of the country were undergoing a process of gradual electrification, such as railway transport and to a small extent agriculture.The wider electrification of these branches of national economy form the task of the second Five-Year Plan period.

The powerful electric base which was created in the first Five-Year Plan period ensured the greatest progress in the reconstruction of industry as well as a Bolshevik tempo in the industrialization of the country. The mastering of the power system which had been created and its further development is a most important link in the completion of the technical reconstruction of all branches of the national economy of the country in the second Five-Year Plan period.

FUEL

THE forcing of the pace of development of the industry and of the entire economy of the country during the first Five-Year Plan period depended upon the consolidation and the development of the fuel base of the Union so as to assure the uninterrupted development of industry and of the economy as a whole.

The consolidation and the development of the fuel base of the country proceeded by way of technically re-equipping the industry, by eliminating and straightening out the historical disproportion in the geographic distribution of the industrial centres and the fuel bases, by creating new fuel bases, interlinked with the big industrial centres or combines, by largely extending the utilization of the local fuel resources and by effectively improving the methods of using all the varieties of fuel. Enormous successes marked this work during the first Five-Year Plan period.

In pre-revolutionary Russia, the supply of fuel to the biggest industrial centres—Leningrad and the northwestern region—came almost exclusively from England. The import of coal from that country amounted to 7.8 million tons in 1913. Moscow, the second big industrial centre and the whole central industrial region, used Donets basin coal, Caucasus oil and only to an insignificant extent local coal and peat.

The utilization on a large scale of local fuel already began during the restoration period and in the course of the first Five-Year Plan period it developed most powerfully. Thus, the output of peat for industrial purposes amounted to 13.8 million tons in 1932, as compared with 1.7 million in 1913 and 5.2 million tons in 1928.

The output of local coal in all parts of the U.S.S.R. amounted to 12.2 million tons in 1932 as compared with 2.8 million tons in 1913, and 6.7 million tons in 1927-28. A great number of new coal fields were developed including the big Karaganda coal fields, the Bukacha in Eastern Siberia, the Tkvarcheli in Transcaucasia, the Pechora coal mines in the Far North, the Ukrainian lignite and a number of others.

By the end of the first Five-Year Plan period, the Leningrad region consumed local fuel to the extent of 30 per cent of its requirements, and the Moscow region to the extent of 46 per cent of its requirements. As to foreign coal, its import was discontinued even before the first Five-Year Plan period.

In 1932, the total supply of fuel (apart from timber and peat procured by the population for domestic purposes) amounted to 100.6 million metric tons of conventional fuel* as compared with 56.8 million tons in 1927-28, and with 103.6 million tons, the figure set by the Five-Year Plan for the year 1932-33, showing an increase in four and a quarter years of 77.1 per cent, while the Plan was fulfilled to the extent of 97.1 per cent. The expenditure of fuel in the country amounted to 96 million tons in 1932, as compared with 53.2 million tons in 1927-28.

The progress made by the fuel industry during the Five-Year Plan period may be seen from the following table of output:

	1913		1927-28		1932-33 Planned figures		1932 Actual figures	
	Quantity	Percentage of total	Quantity	Percentage of total	Quantity	Percentage of total	Quantity	Percentage of total
Wood in mill. cubic metres	68.00	25.2	50.49	17.4	59.80	10.8	80.00	14.9
Peat in mill. tons . .	1.54	1.4	5.31	3.8	12.30	5.3	13.85	5.4
Oil shale in mill. tons	—	—	—	—	—	—	0.32	0.1
Coal in mill. tons . .	29.04	54.5	35.37	60.5	75.00	66.5	64.37	60.3
Including Donets coal in mill. tons	25.29	49.0	27.26	48.0	52.50	49.6	44.74	46.5
Including Kuznetsk coal in mill. tons	0.88	1.7	2.46	4.3	6.10	5.9	7.47	7.4
Oil and gas in mill. tons	9.22	—	11.72	—	21.70	—	22.29	—
Dark oil in mill. tons	6.68	18.9	8.25	18.3	12.54	17.4	13.55	19.3
Total	50.60	100	56.8	100	103.6	100	100.6	100

The above table shows that the Five-Year Plan in respect of the percentages of the different kinds of fuel was not fulfilled (yet there was a somewhat higher proportion of oil fuel and wood in 1932 whereas the coal output fell below the Plan). Nevertheless there was great progress made with local fuel. During the five years the number of large consumers of local fuel has increased.

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* 1 metric ton of conventional fuel represents 7 million large calories.

First among these are the power stations: Shatura, Gorgres, Ivgres, Krassny Oktyabr, Brianskgres, Ossingres, etc., which use peat; Kizel, Chelyabinsk, Kashira, Shterovka, Zuevka and others which use local coal or waste. Of the total output of power by the district power stations, 55.6 per cent of the energy was produced in 1932 by stations using local fuel. These include stations using peat—20.95 per cent, stations using the Moscow district coal—5.7 per cent, those using Donets coal slack—11.3 per cent.

The successes in thermo-engineering attained in the first Five-Year Plan period gave the possibility of mastering the problem of burning hard fuel in a pulverized state (Shterovka, Kashira, etc.).

The development of the milling method in the treatment of peat is of great importance for the mechanization of the peat industry and for lowering the cost of production. However, the adoption of this method was hindered by the difficulties encountered in the burning of the milled peat. Therefore the complete mastery of the process of burning mixed milled peat, a mastery gained by Soviet thermo-engineering in the course of the first Five-Year Plan period, is a fact of outstanding importance which has prepared the ground for the complete solution of the problem of burning milled peat in a pure form. This offered the possibility of increasing the proportion of utilization of milled peat in 1932 to 35 per cent of the total output of peat.

During the Five-Year Plan period, thermo-engineering has likewise solved the problem of rationally burning lignite and other low-grade fuel (coal slack, flotation dust, oil shale, sawdust, etc.), as well as the utilization of exhaust gases.

The creation of a second coal-metallurgical base in the East, *i.e.,* the Ural-Kuznetsk combine, gave a tremendous impetus to the development of the Kuzbas where coal mining in 1932 exceeded the figure set by the Five-Year Plan for 1932-33 by 22 per cent. A new, third, coal base has been created—the Karaganda coal basin.

The industrialization of the country considerably increased the consumption of coal by the industries of the country and the proportion of fuel consumed in the course of the five years by both industry and power stations increased from 64.4 per cent at the beginning of the Five-Year Plan period to 69.1 per cent by its end.

The tremendous increase in the number of tractors and automobiles in the country considerably changed the proportion between the different varieties of fuel, and greatly increased the demand for oil fuel.

The development of the fuel industry during the Five-Year Plan period has ensured the possibility of fully satisfying the needs of the country in all kinds of fuel.

COAL

The results of the first Five-Year Plan in the coal industry are characterized by the following data:

Regions	1913	1927-28	1932	1932 Percentage as compared with	
	(In thousands of tons)			1913	1927-28
Donbas	25,288	27,330	43,940	173.8	160.8
Moscow region	300	1,131	2,617	872.3	231.4
Urals	1,203	1,995	3,174	263.8	159.1
Kuzbas	878	2,525	7,329	734.4	290.1
East Siberia	1,176	884	2,183	356.2	246.8
Far East		1,053	2,007		190.6
Central Asia	138	248	818	592.8	329.8
Karaganda	—	—	723	—	—
Transcaucasia	70	84	196	280.0	233.3
Total	29,053	35,250	62,983*	216.8	178.7

The first Five-Year Plan has considerably changed the geographic distribution of the coal industry having increased the importance of the eastern coal-mining regions and having created new coal bases on the outskirts of the Union, such as Karaganda, Tkvarcheli (Transcaucasia) Borovichi in the Leningrad region, Pechora in the Far North, Raichikha in the Far East, Bukacha in East Siberia, etc. The share of the Donbas in the total coal output declined from 78 per cent in 1927-28 to 70 per cent in 1932, whereas the share of the Kuzbas rose from 7.2 per cent to 11.6 per cent; the share of East Siberia, the Far East and Central Asia as well as the share of the Moscow region has also increased.

The wide scope of capital investment enabled the reconstruction of the entire coal industry. In the first five years, great work was done in mechanizing the mining of the coal. The mechanization of coal cutting rose from 15.7 per cent in 1927-28 to 63.6 per cent by the end of the Five-Year Plan period. These figures cover the whole Union. As to the Donets Basin, its mechanization as compared with capitalist countries reached the following level in 1932:

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* Data refer only to trusts that are under the authority of the People's Commissariat of Heavy Industry.

	Donbas	Germany (Ruhr)	U.S.A.	Great Britain
Cutting	71.9	93.0	77.5	35.0
Loading	72.0	90.0	—	17.5
Haulage	15.0	90.0	85.0	50.0

The mechanization of coal cutting to the extent of 71.9 per cent enabled the doubling of the speed of driving into the seam (from 160 metres to 330 metres a month). At the same time the mechanization of coal cutting made it possible to pass on to an improved system of work, in long wall (working faces), which greatly increased the effectiveness of the heavy coal cutters.

By the end of the Five-Year Plan period, a great deal of work was done in mechanizing the haulage, whereas in previous years the results had been smaller.

During the first Five-Year Plan period, the number of the machines increased considerably: the number of heavy coal cutters increased from 550 in 1928 to 1,470 by the end of 1932, the number of pneumatic pick hammers increased from 71 in 1928 to 7,376 in 1932. The number of conveyor installations, electric engines and other machines has considerably increased.

The output per coal cutting machine per annum was 35,700 tons for the whole Union in 1932 as compared with 26,100 tons in Germany (Ruhr), 21,900 in the U.S.A., and 21,600 tons in Great Britain. The output per pneumatic pick hammer was also higher than in the capitalist countries.

A great number of new pits were sunk in the course of the Five-Year Plan period. By the beginning of the period of the first Five-Year Plan the output of coal in the old pits amounted to 97.5 per cent of the total output, and there were 25 new pits altogether in the course of sinking, with a total capacity of 18.5 million tons. During the first Five-Year Plan period, and particularly beginning with 1930, the sinking of new pits was greatly developed. Altogether at the beginning of the second Five-Year Plan period, there were 186 pits in the course of sinking, with a total capacity of 146.5 million tons. During the first Five-Year Plan period, 129 large new pits were put into exploitation with a total capacity of 50 million tons.* In consequence, the output of the new pits will amount to 56.5 per cent of the total output in the first year of the second Five-Year Plan period, as compared with 2.5 per cent in 1927-28.

As a result of the first Five-Year Plan, the type of the pits has radically changed. In the period preceding that of the first Five-Year Plan, the output of the largest pits did not exceed 500-600 thousand tons; now the new pits in the main regions are capable of producing 1 million tons and more each, per annum.

During the Five-Year Plan period, the coal industry was considerably concentrated. The average output per pit in the Donbas amounted to 127,000 tons in 1932 as compared with 80,000 tons at the beginning of the Five-Year Plan period, and 21,000 tons in 1913.

Apart from large investments made in the sinking of pits, vast sums of money were expended on improving the workers' material and cultural conditions of life. In regard to housing, the floor space of workers' dwellings in the coal regions increased during the Five-Year Plan period from 2,050,000 square metres to 5,222,000 square metres, *i.e.*, an increase of 260 per cent, whereas the number of workers increased not more than 58 per cent.

During the period of the first Five-Year Plan, the reserves of coal have greatly increased owing to the extensive prospecting work carried out. Before the war these reserves were estimated at 221.6 billion tons whereas at the beginning of the first Five-Year Plan period (1928) they were estimated at 553.6 billion tons and by the end of the Five-Year Plan period the estimate was put at 1,073.8 billion tons.

At the beginning of the first Five-Year Plan period, the reconstruction of the coal industry met with certain difficulties owing to the weak development of the mining machine building industry, and of the manufacture of special types of installation. However, by the end of the Five-Year Plan period, a solid base of a home machine building industry had been created, which assured completion of the reconstruction and the mechanization of the coal industry.

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* The total number of pits put into operation, including also the small ones, amounts to 179 with an output capacity of about 57 million tons.

OIL

The radical reconstruction of the technical processes of extraction and refining of oil ensured the fulfilment of the Five-Year Plan for oil in two and a half years. In 1932 the output of oil and gas was 22.2 million tons as compared with 21.7 million tons set by the Five-Year Plan for the last year of the Plan. Accordingly the plan for oil refining was likewise overfulfilled. In 1932 the output of refined oil amounted to 20 millions tons as compared with 19.1 millions tons set by the Plan. As result of the Five-Year Plan the oil industry of the U.S.S.R. rose to second place in the world.

By the beginning of the second Five-Year Plan period, a number of new oil fields were put into exploitation. These new oil fields have a great future before them. These new oil fields are Sterlitamak, Sakhalin, Turkmenia, Georgia and a number of new oil fields in the proximity of the old ones.

Prospecting and developing work which was carried out in the course of the first Five-Year Plan period led to the discovery of a number of new rich layers which already produced a great part of the oil extracted during the first Five-Year Plan period—Surakhany V and VI, Karmak and Podkarmak layers at the Bibi-Eibat, the new Grozny layers XVI, XXI, etc.

The number of working oil wells considerably increased, making a total, by the end of 1932, of 5,986 wells as compared with 4,760 at the beginning of the Five-Year Plan period. At the same time, the proportion between the old and the new wells radically changed. The wells of the pre-revolutionary period do not play any considerable role. In 1926-27, their output amounted to 20 per cent of the total output, but in 1931 their share declined to 5 per cent. The new oil fields prospected and equipped in recent years (in the first place, on the reclaimed Bibi-Eibat Bay), account for a great amount of the output. In 1928-29, the output of the new oil fields amounted to 1,504,000 tons and in 1931 it amounted to 2,637,000 tons or about 11.5 per cent of the total output.

The oil industry entered the first Five-Year Plan period having completed in the main the reconstruction of the technical processes of both drilling and extraction of oil. In the course of the first Five-Year Plan period, the successful results attending the reconstruction of the oil extraction industry were consolidated and further developed, while the oil refining industry was likewise thoroughly reconstructed.

In 1924-25, the extraction of oil by compressors accounted for only 17.5 per cent of the total output, in 1927-28 its proportion amounted to 18.5 per cent and in 1932 to 51.3 per cent. The proportion of oil extracted by the old method of bailing declined from 94.1 per cent in 1913 to 6.3 per cent in 1927-28 and to 0.3 per cent in 1932.

The rotary drilling method replacing the old backward methods accounted for 94.2 per cent of all drilling done in 1932.

The development of rotary drilling reduced the time required for the boring of a well, to a great extent. Here are some data showing the time required to drill a borehole. The figures in the table represent metres per month per drill.

	1927-28	1932
Azneft	69.7	135.0
Grozneft	47.8	91.0
Mayneft	81.2	106.0

The use of improved drilling methods raised the productivity of labour per worker in Azneft from 3.61 metres per month in 1928-29 to 4.57 metres in 1932.

Likewise the output of oil per month per worker increased as follows:

	1928-29	1932
	(In tons)	
Azneft	80.0	129.0
Grozneft	535.0	885.0
Mayneft	111.0	830.0

In the electrification of oil extraction the U.S.S.R. has already overtaken the U.S.A.

The extent of electrification in the mechanized extraction of oil is shown by the following table:

	1920-21	1928-29	1932
		(In percentages)	
Azneft	64.3	98.0	100
Grozneft	20.5	92.5	98

Finally, the reconstruction of the oil industry resulted in the lowering of the cost of production by 36 per cent in 1932 as compared with the cost in 1927-28, and in the lowering of the cost of drilling by 26.5 per cent in 1932 as compared with the cost in 1927-28.

The first Five-Year Plan has solved the problem of reconstructing the oil refining industry. At the present moment the operation of the latest American oil refining installation has been entirely mastered in the oil industry. It is equipped with pipe-stills and cracking installations. In consequence, the output of bright stock increased from 31 per cent in 1927-28 to 41 per cent in 1932. The production of high quality oils such as bright stocks, soluble oils, oil coke, carbon, paraffin, etc., has been mastered. Whereas at the beginning of the Five-Year Plan period, only 65 per cent of the oil produced in Baku was refined, in 1932 all the oil, both light and heavy, was refined.

In the course of the first Five-Year Plan period, 27 pipe stills and five refining batteries were built, with a projected capacity of 15.1 million metric tons. In 1932 the capacity of the refineries in the Union exceeded 23 million tons. Twenty-four cracking plants of a total capacity of 3.3 million tons were built, whereas at the beginning of the Five-Year Plan period, there was not one cracking plant in the U.S.S.R. A number of oil installations with a total capacity of 1.1 million tons were built. For the first time in the U.S.S.R., carbon and coking works and other plants were built. As a result of the Five-Year Plan, the Soviet engineering industry has mastered the manufacture of pipe stills, cracking installations and of all the most important machinery employed in the oil industry.

In the course of the Five-Year Plan period, a number of powerful pipe lines were laid. The Baku-Batum pipe line is 822 kilometres long with a carrying capacity of 1.6 million tons, the Grozny-Tuapse pipe line is 618 kilometres long and its capacity 1.7 million tons. The Armavir-Trudovaya pipe line is 486 kilometres long with a capacity of 1.7 million tons. At present, the powerful Emba-Orsk pipe line is being laid, as well as a number of shorter pipe lines.

THE PEAT INDUSTRY

As a result of the first Five-Year Plan, the peat industry became a large scale branch of industry.

In 1932, the total output of peat for industrial purposes was 13.8 million tons compared with 12.3 million tons set by the Five-Year Plan. The Five-Year Plan was thus fulfilled in the course of four years, to the extent of 112 per cent.

The new peat fields which were developed in the course of the first Five-Year Plan period produced 3.04 million tons in 1932 and the re-equipped old peat fields produced 3.36 million tons. The total output of peat at both the new and re-equipped peat fields reached 6.4 million tons in 1932, or 52 per cent of the total output for 1932 of the peat fields in the system of the Commissariat of Heavy Industry.

The capacity of the new peat fields and of the old peat fields which are being re-equipped amounts to 15.5 million tons.

A radical change has taken place in the methods of extracting and treating peat. In 1928, the output of mechanized peat mining amounted to 15 per cent of the total. According to the Five-Year Plan, mechanized peat was to represent 30 per cent of the total output by the end of the Five-Year Plan period; in fact, mechanized peat represented 50 per cent of the total in 1932. Of particular importance is the milling of peat which is the most advanced method. The peat obtained in 1932 by this method actually amounted to 35 per cent of the total as compared with 4 per cent, the figure set by the Five-Year Plan.

In consequence of the technical re-equipment of the peat industry, the productivity of labour increased by 62 per cent in the course of the Five-Year Plan period.

As a result of the Five-Year Plan, peat occupies a prominent place in the fuel balance sheet of the country and helped considerably in freeing a number of regions from the need to carry coal from remote districts.

OIL SHALE

The development of the extraction of oil shale on industrial lines began during the first Five-Year Plan period. During this period, three new mines were put into operation with a total capacity of about 1.7 million tons (experimental mine at Gdov—200,000 tons, Kashpir on the Middle Volga—1 million tons and Savelyevo on the Lower Volga—500,000 tons).

At Gdov, two rich mines are being equipped, with a capacity of 2 million tons. Thus a base has been created for the further development of the oil shale industry, which from a handicraft industry, with an output of not more than a few tens of thousands of tons, has become a large-scale mechanized industry.

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During the first Five-Year Plan period, the fuel supply of the country has been put on a solid foundation. The fuel base has been radically reorganized. Fuel is a most important element in the technical reconstruction of the industries of the country. The big successes attending the development of the fuel industry, as well as the creation of a home machine building base for the fuel industry in the course of the Five-Year Plan period, ensure the further development of the power resources to the extent required for the completion of the technical reconstruction of the economy of the country as a whole in the course of the second Five-Year Plan period.

THE IRON AND STEEL INDUSTRY

BY the beginning of the first Five-Year Plan period, the iron and steel industry had not yet regained its pre-war level after the disastrous effects of the civil war, and was one of the most backward branches of industry. In 1927-28, the year before the commencement of the Five-Year Plan period, the output of pig iron amounted in all to 3,283,000 tons as compared with 4.2 million tons in 1913, *i.e.*, it had only reached 78 per cent of its pre-war level. The output of steel reached 4,176,000 tons in 1927-28 as compared with 4,231,000 tons in 1913, *i.e.*, 98 per cent of its pre-war output; and the output of rolled metal reached 93 per cent of the pre-war output—3,376,000 tons in 1927-28 as compared with 3,506,000 tons in 1913.

The task set by the Five-Year Plan was to treble the output of pig iron by 1932-33, bringing it up to 10 million tons, to bring the output of steel up to 10.3 million tons and that of rolled metal up to 8 million tons.

"The solution of this problem," it is pointed out in *The Five-Year Plan* (Vol. I, p. 40), "will inevitably proceed along two paths —that of reconstructing on an extensive scale the existing metallurgical works in the two main metallurgical regions of the country, the Ukraine and the Urals, and that of building new great metallurgical works not only in the old metallurgical regions, but also in new regions such as the Kerch Peninsula and the Kuznetsk Basin." Out of the 10 million tons of pig iron planned for 1932-33, 2.6 million tons were to be produced by the new works.

The great increase in the demand for metal, connected as it was with the rapid growth of machine building and the vast scale of construction work, called for special attention on the part of the Government and the Party to the development of the iron and steel industry. Thus, already in the course of the fulfilment of the Five-Year Plan it was found necessary to set additional tasks in connection with the reconstruction of the iron and steel industry, namely:

1) To concentrate the investments to be made upon a limited number of works which could, within the shortest possible time, supply the country with metal and ensure the maximum returns from the investments made;

2) To equip the iron and steel industry with the most up-to-date technique, particularly American;

3) More rational geographic distribution of the iron and steel works and utilization of new sources of raw materials, so as to create bases for supplying the industrially backward regions of the country with metal.

The bulk of the funds invested in the reconstruction of the works in the South and in the Urals was concentrated upon the Dzerzhinsky, Voroshilov and Makeyevka works in the South, and upon the Zlatoust, Nadezhdinsk, Chussovaia, Verkhne-Issetsk and Beloretsk works in the Urals.

Instead of building the small Levshinsky and Tavdinsky plants to work on charcoal, the construction of a powerful metallurgical works was started in Nizhni Taguil; instead of extending the Kerch Works, the construction of Azovstal, a powerful metallurgical works, working on Kerch ore, was started in Mariupol. Besides this, the construction of the New Tula metallurgical works was started. At the same time, construction was started on a special pipe rolling mill in Nikopol, along with the construction of a number of small pipe foundries and pipe welding works situated in metal consuming localities, not provided for in the Plan.

The projected output capacity of the new works was radically changed. Thus, for example, according to the Five-Year Plan the Magnitogorsk Works was to be built with an output capacity of 660,000 tons of pig iron per annum, and the Kuznetsk Works with a capacity of 330,000 tons. In actual fact, however, the Magnitogorsk Works is being built with an output capacity of 2.8 million tons and the Kuznetsk Works with a capacity of 1.2 million tons of pig iron per annum, *i.e.,* the projected capacity of these works was increased four times. The same applies also to other works.

The capacity of the new units, blast furnaces, open hearth furnaces and rolling mills, which are in the course of construction, considerably exceeds the capacity provided for in the Five-Year Plan. Thus, at the Magnitogorsk Works, blast furnaces have been and are being built of 1,180 cubic metres, whereas the maximum measurement of blast furnaces, according to the Five-Year Plan, was to have been 820 cubic metres.

According to the Five-Year Plan, the South was to have maintained its former overwhelming predominance in the output of metal. However, in 1930 the Sixteenth Congress of the Communist Party of the Soviet Union decided "to create a new coal and metal centre in the East, utilizing the rich deposits of coal and ore in the Urals and in Siberia."

The original program for developing the production of special steels—a branch of production newly built up which represents one of the greatest achievements in metallurgy attained during the first Five-Year Plan period—proved insufficient in view of the tremendous development of the machine building industry, notably of the automobile, tractor and aviation industries.

Large additional sums were consequently invested on extensions at the Electrostal Works, on the reconstruction of the Krassny Oktyabr Works at Stalingrad and the Hammer and Sickle Works in Moscow. The works in the Urals were reconstructed with a view to their specializing on the output of special steels.

The following table shows the growth of output in the iron and steel industry during the Five-Year Plan period:

	1927-28 (In thousands of tons)	1932 (In thousands of tons)	1932 Percentage (1927-28 taken as 100 %)
Pig iron	3,283	6,206	*189.0*
Steel	4,176	5,885	*140.0*
Rolled steel	3,367	4,234	*125.7*
Pipe and tubing . .	171	309	*180.7*

The problem of creating a new powerful iron and steel industry, of replacing the former antiquated methods of work on small, poorly equipped units by the use of the most up-to-date and complicated machinery, of replacing the old technique of the nineteenth century by the latest American technique, presented extreme difficulties. Enormous material resources were expended on the construction of new metallurgical giants in formerly uninhabited regions. The difficulties of building new plants and of reconstructing old ones without stopping work in them, and particularly the difficulties experienced by the masses of new workers and young engineers in mastering the advanced technique, accounted for the fact that during the last two years of the Five-Year Plan period the output of metal did not increase so rapidly as had been envisaged in the Five-Year Plan. The mastering of the huge, newly created and technically advanced industrial apparatus demanded more time than would be required if small works, small blast furnaces and open hearth furnaces of the old type were built.

This explains why the iron and steel industry lagged behind the figures set for it by the Five-Year Plan, particularly in the output of steel and rolled metal. However, in spite of this fact, the iron and steel industry has attained tremendous success in increasing the output of metal.

In 1928, the U.S.S.R. held *sixth* place in the world in the output of pig iron, and *fifth* place in the output of steel. Whereas in 1932, the U.S.S.R. occupied *second* place in the world and *first* place in Europe, in the output of both pig iron and steel.

	Pig iron* (In millions of metric tons)		Steel* (In millions of metric tons)	
	1928	1932	1928	1932
U.S.S.R.	3.4	6.2	4.3	5.9
U.S.A.	38.6	8.9	50.9	13.6
Germany	11.8	3.9	14.5	5.7
France	10.1	5.5	9.5	5.6
Great Britain	6.7	3.6	8.7	5.3
Belgium	3.9	2.8	3.9	2.8
Total output of capitalist countries	85.4	32.8	107.2	44.1
Total world output	88.8	39.0	111.5	50.0

The share of the U.S.S.R. in the world's output of pig iron has thus increased from 3.84 per cent in 1928 to 15.9 per cent in 1932, and in the output of steel from 3.85 per cent to 11.8 per cent.

Thus, while the output of pig iron in the capitalist countries declined from 85 million tons to 33 million, *i.e.*, by 61 per cent, and the output of steel declined from 107 million tons to 44 million tons, *i.e.*, by 59 per cent, the output of pig iron in the U.S.S.R. increased by 82 per cent and the output of steel by 37 per cent.

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* The data for the capitalist countries are taken from *Stahl und Eisen*. 1930 and 1932.

These successes of the Soviet iron and steel industry are the results of a grand program of new construction and technical reconstruction carried out on the basis of the country's own accumulation and the application of the best achievements of modern technique, which the capitalist world proved incapable of utilizing.

The Soviet iron and steel industry has not only increased its output but has become an entirely different industry in regard to quality.

At the beginning of the first Five-Year Plan period, there was no iron and steel industry which could serve as a foundation for the industrialization of the country on the basis of advanced technique.

In the course of the Five-Year Plan period, such a metallurgical industry has been created. The Soviet Union has now a vast, new technically up-to-date industrial base for the iron and steel industry, the mass production of special steels has been organized, an electro-metallurgical industry has been created, ferro-alloys and super-hard alloys are being produced.

On this basis alone has it become possible to develop the automobile and tractor industry, the aviation industry, the electric machine building industry, as well as the production of materials necessary for the defence of the country.

During the course of the first Five-Year Plan period, the production of special iron and steel has been organized in the U.S.S.R. In 1927-28 the production of special rolled steel reached 70,000 tons and it was confined to the production of various steels for tool-making, notably of carbon steel for saws, axes and cutters. In 1932, the production of special rolled steel amounted to 555,000 tons. Large-scale production of the following steels has been mastered: different kinds of structural chrome, chrome nickel, chrome-molybdenum, chrome-vanadium steel, the production of steel for ball-bearings, sheet steel for transformers, high-speed steel, stainless steel and heat resisting steel, manganese and silicon steels, etc.

The electro-metallurgical industry was extensively developed. In 1932, about 115,000 tons of steel were smelted in electric furnaces, *i.e.*, 2 per cent of the entire output of steel. At the same time, the output of electric steel in the United States did not exceed 1.5 per cent of the total output, while in Germany it did not exceed 1.1 per cent.

Production of ferro-alloys has been started. In 1931, the first Soviet ferro-alloy works was set in operation at Chelyabinsk in the Urals. In 1932, its output was 14,000 tons of high-grade ferrosilicon and almost 2,000 tons of ferro-chrome. The production of ferro-tungsten was mastered and experiments are being made with the smelting of ferro-vanadium.

The country has created its own production of super-hard alloys, an industry which is of the greatest importance for increasing the productivity of machine-tools, for speeding up drilling, for increasing the resistance of all tools which are apt to get worn out rapidly in the process of work, such as agricultural implements, dredges, excavators, etc. Apart from the alloy "Pobedit" on a tungsten basis, which is similar to the German alloy "Vidia," a number of alloys were produced which do not require rare and expensive materials ("Stalinit," etc.).

In recent years, the ratio between steel and iron has undergone a radical change. Whereas in 1927-28 the output of steel exceeded that of pig iron by 27 per cent, in 1932 it fell below the output of pig iron by 5 per cent, owing to the increased proportion of foundry pig iron and the diminished proportion of scrap contained in the open hearth furnace charge. The proportion of foundry pig iron increased from 21.5 per cent of the total output of pig iron in 1927-28 to 30 per cent in 1932. The ratio of rolled steel in relation to steel has also changed, having been reduced from 80 per cent in 1927-28 to 72 per cent in 1932, owing to the increased proportion of special rolled steel, steel castings and large pipes, rolled from ingots.

There is an increased percentage of all kinds of improved steels, such as axle steel, forgings, boiler plate, telegraph wire, etc. The production of complex structural shape steels for agricultural machine building, for tractorwheel spurs, for rims of automobile wheels, etc., has been organized.

The production of steel pipes increased from 171,000 tons in 1927-28 to 309,000 tons in 1932, *i.e.,* by 80 per cent.

The Five-Year Plan provided for an investment of 2.48 billion rubles in the iron and steel industry and for 240 million rubles in the iron ore mining industry. This did not include investment in metallurgical shops built as part of machine building works.

Actually, investments in the iron and steel industry during the four years and three months amounted to 2.717 billion rubles besides 284 million rubles invested in the iron ore industry.

As a result of the construction work carried out in the first Five-Year Plan period, the fixed capital of the iron and steel industry was doubled. Two-thirds of the fixed capital represents new construction.

During the Five-Year Plan period 40 blast furnaces have been blown in, having a total volume of 18,000 cubic metres and an annual capacity of 4.3 million tons of pig iron, including 17 new blast furnaces having a volume of 12,400 cubic metres; 66 open hearth furnaces having a hearth area of 1,800 square metres and an annual capacity of 2 million tons of steel, including 45 new furnaces having a hearth area of 1,500 square metres; one Thomas (basic Bessemer process) works with four converters, having a capacity of 360,000 tons of steel per annum; 27 rolling mills, having a capacity of about 1.4 million tons of rolled steel annually, including 15 new mills, two tube rolling mills, having a capacity of 115,000 tons of rolled tubes per annum.

By the beginning of the Five-Year Plan period, there were 69 blast furnaces working in the U.S.S.R., having a total volume of 20,000 cubic metres. In the course of the Five-Year Plan period, three blast furnaces were abandoned, four blast furnaces discontinued work for a long period while undergoing radical reconstruction, seventeen new blast furnaces were built, whereas a number of blast furnaces which were not operating were set going again, involving in almost all cases considerable reconstruction and modernization.

Thus, by January 1, 1933, there were 102 blast furnaces working in the U.S.S.R., with a total volume of 36,800 cubic metres. The increase amounted to 16,800 cubic metres, *i.e.,* 84 per cent, while the increase of the annual capacity amounted to about 4 million tons of pig iron.

In 1932, the seventeen new blast furnaces built during the Five-Year Plan period produced 2 million tons of pig iron, including 930,000 tons of pig iron produced at the new works (Kerch, Magnitogorsk and Kuznetsk), *i.e.,* one-third of the entire output of the metallurgical industry.

Eleven blast furnaces out of the seventeen new ones represent powerful, fully mechanized units, not inferior in equipment to the best American blast furnaces.

Of the new works Magnitogorsk has completed two blast furnaces, Kuznetsk—two blast furnaces, and Kerch—three blast furnaces. Of the reconstructed works Makeyevka has three new blast furnaces and Dzerzhinsky—one new blast furnace. All of them have elevated material bins, automatic scale cars, skip hoists, and pig-casting machines (except Kerch). The other newly built blast furnaces, although they have no stock bins, are provided with skip hoists and up-to-date bell-operating mechanisms.

Of the new blast furnaces, two have a volume of more than 1,000 cubic metres each, one over 900 cubic metres, five over 800 cubic metres each, one over 700 cubic metres and five over 600 cubic metres each. The biggest blast furnace in Europe (that of the Hösch Works in Dortmund) has a volume of 914 cubic metres. At the beginning of the Five-Year Plan period the U.S.S.R. had no fully mechanized blast furnaces and not a single blast furnace exceeding 700 cubic metres in volume.

The U.S.S.R. formerly had no pig casting machine but at the end of the Five-Year Plan period, twelve such machines had already been installed.

On January 1, 1933, fifteen blast furnaces were in the course of construction, and of these, nine were nearing completion. Apart from the building of new blast furnaces, the air blast installation and the gas cleaners in the shops already operating were subjected to a radical reconstruction. In the South alone, twenty-one gas blowing engines and six turbo-blowers, with a total capacity of 45,000 cubic metres of air per minute and 100,000 h.p., were installed to replace the antiquated and uneconomical steam driven blowers, thus ensuring the smelting of over 5 million tons of pig iron per annum. The total capacity of all the blowers in the works in the South at the beginning of the Five-Year Plan period was 80,000 h.p. In the works in the South a great advance was made in the cleaning of the blast furnace gas, thus creating the essential conditions for the complete and effectual utilization of this gas. Twenty-four additional disintegrators of the Theisen type and four dry gas cleaners were installed, with a total capacity of 2 million cubic metres of gas per hour.

During the Five-Year Plan period forty-five new open hearth furnaces were built and twenty-one furnaces were reconstructed, while three furnaces were closed down. At the beginning of the Five-Year Plan period, 202 open hearth furnaces were working, with a total hearth area of 4,630 square metres. By the end of the Five-Year Plan period, there were 265 furnaces with a total hearth area of 6,421 square metres.

Almost all the newly built open hearth furnaces are mechanized, having charging machines and powerful ladle cranes.

Three furnaces with a capacity of 150 tons each—the first of their kind in the U.S.S.R.—were built (the open hearth department at the Kuznetsk Works). Apart from this, one furnace with a capacity of a hundred tons was built, and about fifteen furnaces with a capacity of from sixty to seventy-five tons each.

A considerable number of furnaces were built in the existing shops, notably at works of the machine building industry. Five new up-to-date open hearth departments were built (at the Kuznetsk, Karl Liebknecht, Taganrog, Krassny Oktyabr and Electrostal Works). Apart from this, two powerful steel casting foundries were built at the Lugansk Locomotive and at the Ural Machine Building Works. By January 1, 1933, six additional, large, modern open hearth departments were in the course of construction.

A considerable number of electric furnaces were built. Especial mention should be made of steel smelting shop No. 2 at the Electrostal Works, where two open hearth furnaces were built and also two electric furnaces of eight tons each (in January 1933, a third electric furnace of fifteen tons was started), and of the huge department of the new Zaporozhie Works with ten electric furnaces of which the first two, of ten tons each, were started.

The capacity of the steel smelting furnaces was increased during the Five-Year Plan period by 2.5 million tons of annual output.

Reconstruction work on rolling mills mainly took the form of rationalization, mechanization and electrification, of extending the heating furnaces and increasing the capacity of the motors in the existing mills.

Twelve mills, which were formerly not operating, resumed work, including a big rail and structural steel mill at the Kerch Works, the rail and structural steel mills at the Voroshilov and Ilyich Works, the sheet rolling mills at the Makeyevka, Taganrog and Rykov Works, one strip rolling mill and a few merchant mills. Among the new mills installed, first place must be given to the first powerful blooming mill with a rolls diameter of 1,150 mm., installed by the end of the Five-Year Plan period at the new Kuznetsk Works, and to the big rail and structural steel mill installed at the same works. This mill is completely electrified and mechanized. Its projected capacity is 650,000 tons of finished products per annum.

Further, three new up-to-date rolling mills were installed at the Krassny Oktyabr Works. Up-to-date units (light-merchant mill—rod and wire mill) were installed at the Krassny Gvozdilschik Works in Leningrad, at the Zlatoust Works and at the Hammer and Sickle Works in Moscow.

The magnitude of the reconstruction work which is proceeding in the rolling mills of the already operating works may be gauged from the fact that fifty-three new motors with a total capacity of 73,000 h.p. were installed during the Five-Year Plan period, including forty-eight electric motors with a total capacity of 62,000 h.p. This does not include the motors of the Kuznetsk rolling mills and the pipe rolling mills.

Considering the fact that the capacity of all the motors in the rolling mills of the works under consideration represents 250,000 h.p., it may be seen that 30 per cent of the power installation of these works represents new construction.

In the works in the South the total hourly capacity of the rolling mills increased from 365 tons to 618 tons, *i.e.*, by 70 per cent.

The capacity of the new and restored mills amounts to about 1.4 million tons of rolled steel per annum; and the total increase in the capacity of the rolling installations—the result of both reconstruction and of new construction—may be roughly estimated at 2.5 million tons.

By January 1, 1933, a number of huge metallurgical shops were in the course of construction and installation, notably three powerful blooming mills ready to be set in operation at the Makeyevka, Magnitogorsk and Dzerzhinsky Works and several merchant bar mills. Two of these blooming mills were constructed by machine building plants in the U.S.S.R.

Of the pipe rolling mills built during the Five-Year Plan period, mention should be made of the powerful Pilger mill at the Ilyich Works in Mariupol, with an annual output of 100,000 tons of seamless tubes. In 1931 a second Mannesman mill was installed at the Lenin Works in Dniepropetrovsk for the production of seamless pipes of a small diameter (15,000 tons per annum). Five shops for the production of pipes are being built or extended and in 1933 four new mills will be started.

The above list, which comprises the results of construction in the main shops, does not by any means cover the whole work of reconstruction which has been done in the iron and steel industry. Great work was done in connection with the supply of power to works, the building of power stations, sub-stations, the building of boiler departments, transportation inside the works, the building of heat treating, pickling equipment and cold finishing shops, extension of refractory brick shops, machine shops and finishing shops (rail splice bars, tinning shops, wire and cable shops, etc.). Several small pipe shops were built and three large cast iron pipe shops are under construction, with a capacity of 300,000 tons per annum.

As a result of the construction work carried out during the first Five-Year Plan period, a second coal and metallurgical base was created in the East.

The Kuznetsk Works was built in Siberia, representing a complete metallurgical combine, and at the beginning of 1933 its capacity in regard to the output of both pig iron and rolled metal had already exceeded the projected capacity of this works as envisaged in the Five-Year Plan. The ore mine and two gigantic blast furnaces of the Magnitogorsk Works were started, and work in connection with the open hearth department and rolling mill is far advanced. As a result of this work, the share of the East in the total output of pig iron for the whole of the U.S.S.R. had already risen to 25 per cent in 1932, as compared with 21 per cent in 1927-28.

During the course of the Five-Year Plan period, the capacity of the iron and steel industry of the U.S.S.R. almost doubled in regard to pig iron and increased by 50 per cent in regard to steel.

On January 1, 1933, six gigantic works were under construction—complete metallurgical combines, with a total capacity of 8-9 million tons of pig iron; eleven specialized metallurgical works were also being built. Large-scale reconstruction work is going on at thirteen plants.

Including those works now under construction and those which are being set in operation in the first months of 1933, the capacity of the newly built works considerably exceeds the capacity of the whole pre-war iron and steel industry, while their technical level is incomparably higher.

The scale of the works has increased. The average smelting per pig iron plant in 1913 was 60,000 tons, in 1927-28—82,000 tons, while in 1932 it was 132,000 tons, *i.e.,* a 60 per cent increase during the Five-Year Plan period.

The technical aspect of the Soviet iron and steel industry has undergone a radical change, owing to the building of new up-to-date units and the reconstruction of old ones, to extensive mechanization and electrification, to the reconstruction of the auxiliary installations (blowers, gas cleaners, electric supply, transport) and also to the installation of a large number of controlling and measuring instruments, the extension of laboratories and the introduction of new methods of production. One of the most striking proofs of the technical progress which has been made in metallurgy is the success achieved in the production of special steels.

The raw material base of the iron and steel industry was considerably increased, owing to the discovery of new iron ore deposits and to the fact that the presence of fresh reserves has been ascertained at the old deposits. The total ascertained reserves of iron ores for industry amounted to 3,366 million tons on January 1, 1932, as compared with 1,309 million tons on January 1. 1929, *i.e.,* an increase of over 2.5 times.

During the first Five-Year Plan period, mining work was begun on Mount Magnitnaya, which now supplies ore to the Magnitogorsk and Kuznetsk works, on the Telbess deposits in Western Siberia, which help to supply the Kuznetsk Works, and on the deposits of the Kerch mines, which supply the Voykov Works and will also supply the Azovstal Works in the second Five-Year Plan period.

The Khalilov complex ore deposits, discovered during the first Five-Year Plan period in the middle Volga region, are being prepared for mining. These deposits contain nickel and chrome. Mining work will begin here in 1933. The Kuza titano-magnetite deposits in the Urals, which contain vanadium, are also being prepared for mining operations.

The "Kursk Magnetic Anomaly" deserves special attention. Here in the centre of the U.S.S.R. vast deposits of rich iron ore have been discovered. The research work of Soviet scientists who were investigating the anomaly of earth magnetism established the presence of iron ore deposits, and the subsequent drilling work brilliantly confirmed the scientists' indications. Over 100 million tons of rich ore have already been prospected at a depth of 150 metres and the first shaft has been sunk.

The total output of iron ore in the U.S.S.R. increased from 5.726 million tons in 1927-28 to 12.2 million tons in 1932, *i.e.*, by more than two times.

Reconstruction work was begun and developed during the first Five-Year Plan period at the Krivoy Rog and Ural mines.

Out of ten shafts at Krivoy Rog undergoing reconstruction, six are already working. An experimental plant for the concentration of quartzite has been built and work has already started. A district power station has also been built with a capacity of 20,000 kw., thus replacing eight small stations.

The technical equipment of the mines has been considerably enlarged (electric hoists, compressors, electric mining locomotives). The reconstructed shafts are equipped with crushing and sorting installation and work in them has been completely mechanized.

The output of ore at Krivoy Rog was 7.931 million tons in 1932 as compared with 4.430 million tons in 1927-28, *i.e.*, an increase of 80 per cent.

During the first Five-Year Plan period, a more efficient method of extraction was introduced in the mines—drift slicing. In 1928-29, 26.1 per cent of the total ore extracted was obtained by this method, while in 1932 the ore obtained by this method increased to 65 per cent. As a result of the reconstruction of the iron ore industry at Krivoy Rog the process of ore extraction was mechanized 100 per cent by the beginning of 1932 (spur drilling), the haulage of the ore was completely mechanized, while the loading of the ore in the railway trucks was mechanized to the extent of 50 per cent.

Before the Five-Year Plan period, the Ural mines were technically the most backward in the country. Only an insignificant number of processes were mechanized in a few mines. The bulk of the work was done by hand. With a few exceptions horses were employed for transport everywhere.

At the end of the Five-Year Plan period, the state of the technical equipment in the Ural mines was characterized by the introduction of compressors and pneumatic pick hammers, hoists and powerful excavators. A start has been made in the application of American methods of mining in open workings. In 1933, the output of the large-scale Americanized mine on Magnitnaya mountain will exceed by 50 per cent the output of all the old Ural mines taken together.

During the first Five-Year Plan period, a number of concentration works have been under construction, and of these, four ore-washing works with a total output of 310,000 tons have started work.

The U.S.S.R. is thus entering upon the second Five-Year Plan period equipped with a powerful and technically up-to-date metallurgical base which it did not have at the beginning of the first Five-Year Plan period.

The raw material base has been enlarged to three times its former extent, the productive capacity of the metallurgical industry has been doubled, a second metallurgical centre has been created in the East, the technical equipment of the metallurgical industry has been radically changed and the production of special steels has been set up.

CHEMICAL INDUSTRY

THE chemical industry of tsarist Russia represented a technically backward and completely undeveloped branch of industry, not only as compared with the chemical industry of other capitalist countries but even in comparison with the other branches of industry in pre-revolutionary Russia itself. Moreover, even the few primitive chemical works which existed in tsarist Russia were completely dependent upon other capitalist countries for raw material.

The imperialist war reduced the industry to such a state that out of fifty-five small heavy chemical works producing acids, alkalis and mineral salts in tsarist Russia, only thirty-eight enterprises were left and owing to the wasteful way in which they were utilized during the war they were largely worn out.

When the proletarian State of the U.S.S.R. took over the industries of the country there were only a few, half-ruined, small chemical enterprises. The wear and tear was so great that the chemical works could produce, at the utmost, 10-15 per cent of their original capacity. By the end of 1917, the total capacity of the sulphuric acid works, which existed on the territory of what is now the Soviet Union, hardly reached 100-110,000 tons, and only one of these works produced ten thousand tons of sulphuric acid per annum, whereas the other thirty-two sulphuric acid works were producing not more than one hundred thousand tons.

The U.S.S.R. was faced with the task of creating a new chemical industry and preparing a raw material base of its own for it.

During the first period, when the U.S.S.R. was re-establishing the pre-war level of its industries, great progress was made in the development of the chemical industry; still, by the beginning of the first Five-Year Plan period, the Soviet Union had no modern chemical industry.

The Sixteenth Conference of the Party and the Fifth Congress of the Soviets, in approving the Five-Year Plan, set before the country the task of creating a new chemical industry.

In the course of the Five-Year Plan period the chemical industry of the Soviet Union developed into a powerful industry. Without counting the soap, perfume, wood distillation and the bone reducing industries, the chemical industry had a capital of over 1.5 billion rubles, the capital investments considerably exceeded the figures of the plan. The output of chemical products by the end of the first Five-Year Plan period increased, reaching a total value of 1.5 billion rubles. The following branches of the chemical industry were created anew—synthetic nitrogen, coke by-products, aniline dyes, many chemical-pharmaceutical products, rosin and turpentine, rayon, phenolic and other synthetic resins, synthetic rubber, potassium salts, apatite and a number of other branches. Large chemical works with the most up-to-date equipment were built.

The Soviet Union's share in the world chemical industry has changed sharply in consequence of this tremendous development. During the period of 1928-32, owing to the unprecedented crisis, the chemical industry of the capitalist countries declined, having been thrown back ten years, whereas the chemical industry of the Soviet Union has developed during the four years at a pace beating all past records of the world chemical industry in the years preceding the crisis. In regard to chemical production, the Soviet Union has overtaken quite a number of countries. In four years, the Soviet Union raised its share in the output of the world chemical industry six and a half to seven times.

The progress of the heavy chemical industry in the U.S.S.R. during the first Five-Year Plan period, as compared with 1913, is shown in the following table:

	1913		*1928*		*1932*	
	In thous. tons	Per cent	In thous. tons	Per cent	In thous. tons	Per cent
Sulphuric acid	110	*100*	242	*220.0*	495.0	*450.0*
Superphosphate	62	*100*	182	*293.6*	612.0	*987.1*
Soda ash	154	*100*	230	*149.4*	288.1	*187.0*

The above data prove sufficiently clearly the tremendous development of the heavy chemical industry during the Five-Year Plan period particularly if it is taken into consideration that a number of huge combines of heavy chemical industry now in course of construction will be completed only in 1933 and consequently the effect of their large output will be felt only in the first years of the second Five-Year Plan period. Among these combines are to be numbered the Vozkresensk, Nevsky, Aktyubinsk, Bobriki, Gorlovka, Berezniki, etc. In the place of the dwarf works with a capacity of three or four thousand tons per annum which had been inherited by the U.S.S.R., there are now giant chemical works with the most up-to-date technique, works that produce not only simple fertilizers but mixed fertilizers including nitrates.

During the Five-Year Plan period, a number of new and most complex branches of heavy chemical industry were built. In the first place, the manufacture of synthetic ammonia, potash and other mineral salts (chromates, fluorides, etc.), elementary sulphur, chlorins, insecticides, reagents for flotation processes, etc., was organized.

The heavy chemical industry in pre-revolutionary Russia was built up and developed chiefly on imported raw material and intermediates. During the first Five-Year Plan period a number of most important raw material bases in the Soviet Union were discovered and prepared for development. The rich deposits of apatites, phosphate rock, chromites, barites, sulphur, etc., are now in the service of Soviet industry. The soviet base of raw material now extends from the North Polar circle to the remotest deserts of Central Asia and, as a result of the achievements of the first Five-Year Plan, assures the complete independence of the Soviet Union from foreign raw material.

In the course of the Five-Year Plan period, the U.S.S.R. has been able to develop the rich deposits of apatite-nepheline ore on the Kola Peninsula. At Khibiny, development work is proceeding on a large scale in the apatite mines, and a flotation concentrating plant is being built with a total capacity of one million tons. The Khibiny phosphate concentrates excel the best Morocco phosphorites in quality. At Khibinogorsk not only apatites are being mined but a number of other most valuable minerals which are of the greatest importance. Preparations have been made for the industrial exploitation of huge potash deposits running into billions of tons.

By 1933, the first potash mine, with a capacity of 1.5 million tons per annum, was completed, and a concentration plant with a capacity of 1.2 million tons per annum was built. At the same time, development work was energetically proceeded with at a second mine of an equal capacity. When this mine is completed, it will be possible to produce 3 million tons of potash for agriculture annually.

The aniline dye industry, which in pre-war Russia represented a miserable appendage to the German aniline industry (the Russian chemical plants were working up intermediates imported from Germany), was also extensively developed. Only by 1927-28 was an independent aniline dye industry established in the Soviet Union, while hitherto this industry had to work largely on foreign raw material which claimed an expenditure on the part of the U.S.S.R. of tens of millions of rubles.

During the first Five-Year Plan period, the aniline dye industry has been completely reconstructed. In the new enterprises of this industry about 100 million rubles were invested. This assured the further development of the aniline dye industry which in four years more than doubled its output, and what is most important, it assured the creation of a domestic raw material base. In the course of the first Five-Year Plan period, the Soviet Union attained exceptional successes in the output of a large number of new chemical products which are of the greatest importance for the country and in the manufacture of which home materials were used exclusively.

The coke industry of tsarist Russia satisfied the small needs of the country in coke products (excepting coke), whereas all the coal-tar products were imported from abroad. Of the five thousand coke ovens of pre-revolutionary Russia, only three hundred ovens were of recovery type, equipped with recuperation plants for the utilization of the valuable by-products. The U.S.S.R. had succeeded in completely re-establishing the by-product coke industry by 1927, and is reconstructing the old by-product coke enterprises to a considerable extent. However, the total amount of the chemical by-products obtained from coking at the beginning of the first Five-Year Plan period was insignificant, which necessitated the creation of this new branch of the chemical industry in the course of the first Five-Year Plan period.

During the first Five-Year Plan period, the production of chemical by-products of the coking industry increased three and a half times. Of the total quantity of coke obtained in the last year of the Five-Year Plan period, 80 per cent was produced at the by-product coke works which have been newly erected and reconstructed. Moreover by the end of the Five-Year Plan period, fully 92 per cent of the coal-tar available for industry was fully distilled in the newly built coal-tar distilleries. Exceptional progress was made by the by-product coke industry in the manufacture of a number of quite new products, which are of great economic importance.

All this freed the Soviet Union from foreign import of all coal-tar products.

The rubber industry in tsarist Russia existed as a branch which mainly produced objects of general consumption, such as rubber shoes, toys, etc. In the first Five-Year Plan period along with the development of the manufacture of goods for general consumption, the rubber industry developed the mass production of technical products and of goods for the requirements of the automobile industry (tires, tubes, etc.).

During the Five-Year Plan period, the rubber industry was radically reconstructed and became a large-scale industry not to be compared with the pre-revolutionary semi-handicraft rubber enterprises.

The great technical equipment of the rubber industry ensured the completion of its Five-Year Plan in three years. The output of rubber technical goods in 1932 increased 89.3 per cent as compared with 1913, and 300 per cent as compared with 1928. The output of chemical products for general consumption increased 2.4 times in 1932, as compared with the output of 1928. This is exclusive of the new giant rubber works of Yaroslavl which started working at the end of 1932, and is to produce more than six million automobile tires annually, 35 thousand tons of asbestos goods, 25 thousand tons of rubber soles and other rubber goods to a total value of about 900 million rubles.

The paint and varnish industry in the U.S.S.R. developed from small, mostly primitive enterprises manufacturing the simplest mineral paints along with varnish and laquers and using imported raw material, while by the end of the Five-Year Plan period it became a large-scale paint and varnish industry of a great output and a high technical level.

New processes have been introduced and new varieties of raw material are used. The output of the paint and varnish industry rose from 60 million rubles in 1928 to 120 million rubles in 1932, which shows an increase of four and a half times, as compared with 1913. This level was attained almost completely on a domestic raw material base along with the extensive development of the manufacture of the nitrocellulose varnish, solvents, the application of artificial drying oils, development of the manufacture of synthetic resins, and the utilization of waste from various branches of industry.

The chemical-pharmaceutical industry, like a number of other branches of the chemical industry, is an achievement of Soviet chemistry. In pre-war times the chemical pharmaceutical industry in Russia was very little developed and only in the laboratories of some of the large chemists were pharmaceutical compounds produced.

The most urgent task of the chemical-pharmaceutical industry was research work in industrial processes, the mastering of the technology of a very considerable list of articles, as well as the creation of a domestic raw material base. In the main, this task may now be considered solved. There exists a possibility of manufacturing chemical-pharmaceutical products to the value of 60 million rubles per annum. Apart from the mass output of medicines, pure chemicals and technical chemical products, a great number of new manufactures has been organized in the chemical-pharmaceutical industry.

The manufacture of plastics in the Soviet Union was quite insignificant before the Five-Year Plan period, and its output amounted to not more than 3,000 tons per annum. During the first Five-Year Plan period, a large number of new works was built. In the last few years, 40 million rubles were spent on new construction alone. This assured the increase of the output of plastics to the value of 50 million rubles. The construction of the first huge combine (Vladimir) and the extension of the existing works makes it quite possible to treble the 1932 output in the course of the next few years.

Plastics are being introduced to an ever greater extent in industry, and special importance attaches to the fact that in the current year these products will be used for the manufacture of valuable technical parts, such as noiseless drive, helm steering wheel (nautical), parts for automatic brakes, tractors, etc.

The artificial fibre industry did not begin to develop until recent times. In pre-war Russia there was only one factory which produced 100 tons of rayon per annum, while the annual import from abroad amounted to 700-800 tons.

The building of artificial silk works was developed only in the first Five-Year Plan period. Two works have already been completed, and have started work. The third will start work in 1933. This ensures a big development of rayon production. And this is only the first step in the organization of this new branch of industry. The most important works are not completed yet, and will only start running in the second Five-Year Plan period. However, the wide scope of construction work fully guarantees the rapid development of this industry.

The production of synthetic rubber, which has been started for the first time in the U.S.S.R., is of especial value. Soviet rubber industry was forced to develop its production on imported rubber. While referring to this at the conference of Soviet business managers, Joseph V. Stalin pointed out: "In our country we have everything except perhaps rubber. Within a year or two we shall have our own rubber as well."

The Soviet industry during the Five-Year Plan period has taken up the manufacture of synthetic rubber as the shortest cut to the solution of the rubber problem and to the speediest liberation of the country from foreign import. At the same time, however, wide measures were taken in the matter of cultivating rubber bearing plants.

As a result of successful scientific research work, the problem of synthetic rubber has been solved. The first two synthetic rubber works were built, and two more are in the course of construction. This offers the possibility of obtaining a considerable quantity of Soviet synthetic rubber for the rubber industry in 1933.

Along with the achievements of Soviet chemistry indicated above, it is necessary to mention some other important achievements in the field of synthetic production. Synthetic solvents, resins, varnishes, metanol, acetic acid and a number of other new manufactures—this is an incomplete list of articles, the manufacture of which has been mastered in the Soviet Union during the Five-Year Plan period.

The wood distillation industry of pre-war Russia was particularly backward and consisted of a number of primitive handicraft shops. The huge timber resources of the country were wasted in the manufacture of products of small value, while the highly valuable products of wood distillation such as resin, etc., were imported from abroad. The Soviet Union was confronted with the task of having to build this most important branch of industry quite anew. And in the place of the primitive shops, new up-to-date plants were built, manufacturing the highly valuable resin and turpentine instead of tar of low value. Considerable progress was made by the new turpentine and resin factories which manufacture products of sap (gathered by the method of cupping which had not been practised in pre-war Russia).

The first huge works of this type (Vachton, in the Gorky region) was built in 1928 by Soviet engineers.

In the field of dry wood distillation, big successes were achieved, particularly in that all by-products are fully and rationally utilized. The first big up-to-date plant (using the continuous process) was built in the Urals. The output of valuable products of the wood distillation industry greatly increased. The total output of the chemical wood industry rose from 36 million rubles in 1928 to 100 million rubles in 1932, *i.e.,* an increase of almost three times (in 1926-27 prices).

The Soviet chemical industry was built up entirely during the first Five-Year Plan period and is served by the most up-to-date technique.

BUILDING MATERIALS AND THE TIMBER INDUSTRY

BUILDING MATERIALS

As a result of the enormous growth of construction in every field of national economy, exceptionally great demands were made upon the building materials industry and the timber industry.

At the beginning of the Five-Year Plan period these industries were at a relatively low technical level, the work in many cases partaking of a handicraft nature.

The increased demands with which the construction work confronted the building materials industry, particularly in connection with the overfulfilment of the construction program, necessitated a rapid development of production in these branches of industry and their reconstruction on a large scale. At the same time it became necessary to introduce a new assortment of building materials, determined by the changed character of construction and above all by the enormous growth of construction in the heavy industry.

The development of the various individual branches of the building materials industry during the past four and a quarter years has been as follows.

Production of cement went up from 11 million barrels in 1927-28 to 22.5 million barrels in 1932, while the capacity of the cement mills at the end of 1932 reached 32 million barrels a year. During the Five-Year Plan period 323 million rubles were invested in the construction of new cement works and in the reconstruction of the old works. New works with an aggregate capacity of 14.5 million barrels were built. Fourteen old works were reconstructed and their capacity was raised from 10.5 million barrels to 17.6 million barrels a year.

The character of the new construction going on in the country, the vast scale of hydraulic and hydro-electric construction, the construction work being done in the metallurgical, railroad and water-transport (bridges, dams, locks) industries, necessitated a radical change in the very composition of the output of the cement industry.

The quality of the cement produced in 1932 was altogether different from that produced in 1927-28. Sixty-five per cent of the total quantity of cement produced in 1932 consisted of high grade quick-setting cement. This is entirely the achievement of the first Five-Year Plan period.

In addition to the development of the cement industry, the first Five-Year Plan period also brought about a considerable growth in the output of other building materials (lime, chalk, alabaster). The production of lime went up from 520 thousand tons in 1927-28 to 2.7 million tons in 1932; the output of alabaster from 241 thousand tons to 570 thousand tons, that of chalk from 123 thousand tons to 340 thousand tons. At the beginning of the Five-Year Plan period these industries were mainly of a handicraft character and employed a correspondingly primitive technique. During the Five-Year Plan period plants with a capacity of from 50,000 to 100,000 tons have been built within the sphere of heavy industry, while the co-operative system has to a large extent renovated and reconstructed these formerly handicraft lines of production.

The production of bricks during the first Five-Year Plan period increased from 1.78 million in 1927-28 to 4.8 million in 1932. In common with the other branches of the building materials industry, the brickyards also underwent extensive technical reconstruction. Scores of new yards were built during the Five-Year Plan period with an output of from 50 to 100 million bricks a year, the new brickyards being completely mechanized in all cases.

The scale of construction work, the reconstruction of the building processes themselves, their industrialization and mechanization, made new demands upon the industry producing wall materials. The production of large artificial stones, the working of deposits of natural building stones (Caucasian artic tuff and shell limestone) and the manufacture of new shield-materials (fibrolite, canite) provided the building industry already in 1932 with 15-18 per cent of its requirements in wall materials. Great advance was made in the scientific research connected with the production of new materials.

The large-scale factory production of standard wooden parts has been started for the first time. That which was the product of the individual carpenter and joiner at the beginning of the Five-Year Plan period has become an object of mass production turned out in millions at the end of the first Five-Year Plan period (transoms, frames, doors and other parts). The production of standard frame houses by factory methods has also been organized for the first time. During 1932 standard houses were produced with a total floor space of 3 million square metres.

In addition, a number of auxiliary plants producing mainly new building materials were built by the construction jobs. The creation of auxiliary plants and the development of the production of new building materials and constructions by industry is thus crystallizing the new tendencies connected with the industrialization of the building industry—the introduction of the system of assembly construction, standard construction, large-block construction, and construction based upon the utilization of industrial by-products (slag concrete, slag cement, etc.).

Roofing iron, which was universally used at the beginning of the first Five-Year Plan period, can no longer meet the growing demands of the building industry. The necessity of diverting the supply of roofing iron to meet the needs of machine building, oil and other industries, was the occasion for a rapid development of the production of other roofing materials. The production of pitched paper increased from 1.22 million rolls in 1927-28 to 3.3 million rolls in 1932, while the production of rubberoid increased from 38,000 rolls in 1927-28 to 397,000 in 1932. The production of rubberoid was especially speeded up in connection with the demand for roofing materials to span the huge departments of the new plants. The production of artificial slate went up from 38.4 million plates in 1927-28 to 114.6 million plates in 1932.

The development of the iron and steel industry, the construction of new giant plants in the iron and steel industry and the reconstruction of the existing plants, the development of the coke industry and the extensive construction of new coke batteries and coke-chemical plants together with the creation of a chemical industry on a giant scale, the reconstruction and construction of steam power plants, meant a demand for suitable fire-proof materials in vast quantities. At the beginning of the Five-Year Plan period methods of production in use in the fire-proof materials industry were characterized by extreme technical backwardness and semi-handicraft methods of work. During the early years of the Five-Year Plan period it was necessary to rely to a large extent on imported fire-proof materials for the iron and steel and coke-chemical industries. The reconstruction of the fire-proof materials industry did not keep pace with the growth of the demands made upon it by the iron and steel industry and the other branches of the national economy. At the end of the first Five-Year Plan period, however, the U.S.S.R. already had its own fire-proof materials industry and in 1932 it became possible to dispense with the importation of fire-proof materials.

During the first Five-Year Plan period three refractory-brick works with an output of 290,000 tons and two silicate plants with an output of 195,000 tons were set in operation: besides this, the old fire-proof materials plants (the Borovichi and Chasovari groups) were reconstructed and huge plants were built at the Magnitogorsk and Kuznetsk works, while the fire-proof materials departments of the existing metallurgical plants were also reconstructed and expanded. The capital investments of the last years of the first Five-Year Plan period have ensured a powerful development of construction work on a number of new fire-proof materials plants, notably in the Urals; and the basis has thus been laid for a considerable increase in the capacity of the fire-proof materials industry during 1933.

The development of the fire-proof materials industry during the Five-Year Plan period is indicated by the following figures: Production of refractory bricks increased from 430,000 tons in 1927-28 to 808,000 tons in 1932. Production of silicate went up from 94,900 tons in 1927-28 to 180,000 tons in 1932.

In addition to this, the production of quartz clay and Gzhelsk brick has also been developed, the output having increased ten times during the Five-Year Plan period. The development of the production of this special brick has been speeded up with a view to replacing the first-class fire-proof materials in cases where the latter are not urgently required.

Special mention must be made of the fact that the fire-proof materials industry was able to master the mass production of complex pattern products for blast-furnaces, open-hearth furnaces, Cowper furnaces, coke furnaces, steam power stations, etc., and to adopt this form of production in the latter part of 1932.

At the beginning of the Five-Year Plan period the glass industry was characterized by a largely semi-handicraft form of production and by the extremely worn-out and antiquated character of the plant. The glass blower was a typical figure in the glass industry. Even before the first Five-Year Plan was launched, the Soviet Government set about building glass works based upon mechanized production. Nevertheless, by the beginning of the Five-Year Plan period only 9.4 per cent of the total output of the glass industry was produced by machinery. In consequence of the construction of new plants, and reconstruction and mechanization of many of the old plants, the proportion of the glass industry's output produced by mechanical means exceeded 30 per cent in 1932.

The growth of production in the glass industry during the first Five-Year Plan period may be seen from the following data. In 1927-28 production of window glass amounted to 132,000 tons. of which 118,000 tons were semi-white and plate glass produced by hand, while only 14,000 tons were produced by machinery; whereas by 1932 this output had risen to 166,000 tons, of which 122,000 tons comprised plate-glass produced by machinery and 44,000 tons semi-white glass produced by hand.

The general character of the glass industry's output has undergone considerable changes. The production of technical glass, which is practically a new line of production in the country, increased from 1,200 tons in 1927-28 to 10,000 tons in 1932. The production of triplex-glass has also been mastered for the first time and the necessary quantity of it is being produced. This also applies to various articles for the chemical industry, notably the highly complex Frenel lenses, Dutch glass for high-pressure boilers, ship glass and glass for searchlights. The output of electric retorts went up from 1,000 tons in 1927-28 to 6,000 tons in 1932 and what is of special importance, their production has been organized in non-stop tub furnaces instead of in pot furnaces, as was previously the case.

Special mention should be made of the use by the glass industry of mechanized methods of production and employment of machinery. Instead of the 10 Fourcault machines which are installed on one canal in capitalist countries, the glass industry of the

U.S.S.R. instals 12 and is even beginning to instal 15 on a canal of equal capacity.

THE TIMBER AND WOODWORKING INDUSTRIES

The exploration, control, and exploitation of the timber resources of the U.S.S.R., represent a problem of great difficulty and truly colossal dimensions. The vast forest areas located in regions not yet opened up, the extreme complexity of the transportation problem, and the very low technical level of this industry at the beginning of the Five-Year Plan period, account to a large extent for those difficulties which have been encountered in the reconstruction of the timber and woodworking industries. The demands made upon these industries were conditioned by the scale and tempo of construction, in which lumber plays a very important part, by the need for increasing the export resources, by the development of the machine building and other industries using timber in the form of raw materials and semi-finished products.

The general results achieved in the timber and woodworking industries are indicated by the following figures. The quantity of lumber obtained for industrial purposes increased from 41.1 million cubic metres in 1927-28 to 98.5 million cubic metres in 1932, an increase of 2.4 times in four and a quarter years. Production of sawn materials increased from 11.5 million cubic metres in 1927-28 to 22.2 million cubic metres in 1932, an increase of 92 per cent. A comparison between the growth in the production of sawn wood and the amount of timber obtained for industrial purposes shows that the woodworking industry is still lagging behind.

The handicraft and semi-handicraft sawing of timber at the place of construction, the installation of saw-mill frames at the big construction jobs and the replacement of sawn materials by other materials, notably materials for partitions (fibrolite, canite) has made up for the backwardness of the woodworking industry.

It is necessary to note the great development that has taken place in the ply-wood industry, the production of which went up from 185,000 cubic metres in 1927-28 to 424,000 cubic metres in 1932. An entirely new line of production is that of silo-towers which has been brought into being by the collectivization of agriculture and the organization of large stock-breeding State farms.

Wooden pipes also represent a new line of production. New plants under the control of the People's Commissariat of Timber, which have been started during the first Five-Year Plan period or are ready to start in 1933, represent a total production of 4,500 kilometres of wooden pipes a year. Besides this, the production of wooden pipes has also been extensively developed by other organizations.

Industrial production of standard houses and of various types of wooden packing has also been organized for the first time in this country.

A series of measures were carried into effect during the first Five-Year Plan period with a view to raising the technical standard of the timber and woodworking industries. The axe and saw are beginning to make room for machinery.

As regards transportation, 9,000 kilometres of ice-roads for horses, and 3,400 kilometres of corduroy roads for hauling timber by horses, 550 kilometres of ice-roads for tractors, 740 kilometres of narrow-gauge railways, 300 kilometres of single rail suspended railways have been built during the first Five-Year Plan period. This made it possible in 1932, to haul 20 per cent of the timber by mechanized and rationalized means.

The aggregate power of all mechanical traction employed in the timber transport system under the People's Commissariat of Timber is equal to 80,000 h. p.

At the beginning of the Five-Year Plan period the timber industry did not have a single rafting machine or unloading machine unit. At the end of the Five-Year Plan period there were 180 rafting machines and 750 unloading machine units. All this testifies to the advance of mechanization in every field of the timber industry, which is to undergo particularly great development in the second Five-Year Plan period.

In the woodworking industry over a thousand sawing frames have been installed, the output of which constitutes more than half of the total output of the sawing frames existing in the industry. The development of the woodworking industry is also marked by a high degree of concentration of production, and by the fact that the very type of plant in use has changed during the first Five-Year Plan period. Sixty-five per cent of all newly built saw-mills now have more than four frames each, whereas at the beginning of the Five-Year Plan period practically the entire woodworking industry consisted of one or two frame saw-mills.

The growth of the capacity and production of the timber and woodworking industries was accompanied by a marked improvement in the products of the saw-mills through planing, drying etc. Of planing machines alone there were more than 240 installed during the first Five-Year Plan period. This meant an increase by two and a half times of the whole number of planing machines in the timber industry.

The improvement in the well-being of the workers and of the toilers in the countryside created a great demand for the products of the furniture industry which increased its output from 56 million rubles in 1927-1928 to 185 million rubles in 1932 (according to the prices of 1926-27).

Note should also be taken of considerable changes in the geographic distribution of the timber industry. During the first Five-Year plan period the U.S.S.R. began to harness the vast timber regions of the Far East, Siberia and the Far North, thus shifting the sphere of woodworking to these future centres of the timber industry.

During the first Five-Year Plan period eight new saw-mills with 56 frames were built in the North, 32 sawing frames were installed in Siberia, more than 40 in the Far East, etc.

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The development of all branches of the building materials industries and the adoption of factory methods of production in place of the old handicraft methods has served as the material base for the gigantic development of construction during the first Five-Year Plan period. The building materials industry is entering upon the second Five-Year Plan period with incomparably greater resources, thus ensuring a further growth of construction.

LIGHT AND FOOD INDUSTRIES

THE gross output of the light and food industries (group "B" of census industry) amounted to 16.3 billion rubles in 1932 as against 8.7 billion rubles in 1928 and 5.96 billion rubles in 1913. Towards the end of the first Five-Year Plan period, the output of food products and articles of general consumption by the large-scale State industry increased 2.7 times as compared with the year 1913 and by 87.3 per cent as compared with the year 1928. The Five-Year Plan for all branches of the industries of group "B" was fulfilled to the extent of 84.9 per cent, with light industry lagging behind and food industry overfulfilling the plan. The output of a number of the most important food products increased several times during the first Five-Year Plan period. Thus, the output of canned goods increased 8.7 times, the output of confectionery products increased six times, etc.

At the beginning of the Five-Year Plan period, light industry was based on imported raw materials. In 1928, imports of cotton amounted to 150 million rubles, wool—70 million rubles, raw hides—40 million rubles. The Five-Year Plan for the development of light industry provided for further importations of considerable quantities of raw materials and, at the same time, for the development of a home base of raw materials.

In the course of carrying out the Five-Year Plan, it was found necessary to make some changes in the import plan. It was found necessary to increase the proportion of imports of equipment and metals at the expense of raw materials for light industry, the importation of which was stopped. At the same time, means were applied to stimulate the carrying out of the tasks of the Five-Year Plan for the creation of a home base of raw materials.

The rates of increase in the output of group "B" industry during the years of the Five-Year Plan period were very high. An 87.3 per cent increase for four years and three months makes an annual growth of 17 per cent, which is considerably higher than the rate of growth of production in capitalist countries even in the best years of their economic "prosperity." In the United States the average annual growth of production of articles of general consumption during the five years 1925-29 was 1.4 per cent. In Germany the percentage of growth during the same years was 3.1, while in England the output of articles of consumption during 1925-29 was reduced by 1.9 per cent.*

A great victory was attained during the first Five-Year Plan period by the creation of a home base of raw materials for light industry. In this realm decisive successes have been achieved: the U.S.S.R. has been completely freed from the necessity of importing cotton; similarly, the supplies of flax fibre, tobacco, wool and hides have increased.

Simultaneously with the growth of supplies of basic technical crops, the cultivation of new kinds of raw materials (southern hemp, Java jute *[Kenaf])* has been started and developed, as well as the production of artificial raw materials (rayon, artificial wool, cottonized fibre, leather substitutes, synthetic fat acids, synthetic rubber, etc.).

The production of new kinds of raw materials and substitutes considerably increases the resources of raw material. The capacity of the plants producing substitutes for the leather industry ensures the output of 80,000 tons of raw materials to take the place of natural hides; this, again, makes it possible to ensure an output of shoes three times as large as that produced by State industry in the year 1927-28. The cottonine industry, in 1932, furnished about 15,000 tons of additional raw material for the textile and wool industries. Artificial silk occupies an important place among the supplies of raw materials for the knit goods industry.

Simultaneously with extending the base of raw materials for light industry, much has been accomplished in the work of mechanizing the processes of the primary treatment of raw materials. Hundreds of factories have been built for the primary treatment of flax. At the beginning of the Five-Year Plan period, there were no more than eighteen plants for the primary treatment of flax; by January 1, 1933, there were already 350 plants in operation and more than 300 in the process of construction, to be completed and some to be started during the next one or two years. At the beginning of the Five-Year Plan period, there were two plants for the primary treatment of hemp; by the end of the Five-Year Plan period, there were 65 plants. The number of ginning machines at the cotton ginning plants has increased from 492 in 1928 to 651 in 1932. The number of plants for the curing of tobacco increased from three at the beginning of the Five-Year Plan period to fourteen at the end of the Five-Year Plan period. The development of the primary treatment of raw materials by the factory method is contributing towards the better utilization of raw materials and the improvement of their quality.

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* According to the data of the *Institut für Konjunkturforschung*, Berlin, *Sonderheft*, No. 19, 1933.

An important achievement was the organization of machine building for light industry.

The development of light industry in tsarist Russia was based on foreign technical equipment. Machine construction for the textile industry in tsarist Russia was limited to a few semi-handicraft shops which produced the simplest weaving looms and primitive equipment. All branches of light industry—textile, shoes, etc.—imported their equipment from abroad.

As a result of a thorough reconstruction of the existing plants and the building of new plants, an internal base for machine construction for light industry was created. The technique of the production of a great number of various machines, including the most complicated types, for many branches of industry—for the textile industry, for the shoe and leather goods industry, for the printing industry, etc. has been mastered. For the textile industry alone more than 125 types of new machines are being produced in the country.

As a result of the first Five-Year Plan, the U.S.S.R. has freed its light industry from dependence upon capitalist countries in the decisive matter of its supplies of equipment and spare parts.

At the same time the U.S.S.R. has made an end to its dependence upon imports from capitalist countries for furnishing light industry with essential auxiliary materials, semi-finished products and technical supplies, the production of which has been started and mastered within the country (tanning materials, dyeing materials, runners, knitting needles, card fillets, etc.).

In the course of the first Five-Year Plan period, old enterprises were reconstructed, new enterprises were set up in old branches of industry, and, finally, entirely new branches of industry, never known in tsarist Russia, were created.

During the four years, operation was started on 13 large textile mills, 3 large knitting mills, 3 linen factories, 4 woollen factories, 13 clothing factories, 4 shoe factories, 11 leather factories, 2 cinema film factories, an immense moving picture producing enterprise, scores of printing shops, etc.

During the first Five-Year Plan period, the whole group of industries producing articles for cultural needs was actually created anew: the production of musical instruments, of scientific and teaching supplies, the cinema industry, the production of radio apparatus, the production of photo cameras, of gramophones, etc.

The knit goods industry has grown and developed during the first Five-Year Plan period. This industry has been equipped with entirely new machinery. Its output rose in value from 201.9 million rubles in 1928-29 to 500.5 million in 1932.

The clothing industry has been transformed into a large-scale mechanized industry with a number of factories which are the largest in the world. The output of the clothing industry rose in value from 285 million rubles in 1927-28 to 1.55 billion rubles in 1932.

In the textile, linen and tallow industries we have mastered the production of a number of new products, the necessity for which arose with the growth of the industrialization of the country.

The shoe industry was transformed into an advanced branch of large-scale industry. In almost all shoe factories the conveyor system was introduced and the cycle of production was reduced by from two to three times as a result of reconstruction and specialization. The output of the State shoe industry rose from 23 million pair in 1927-28 to 73.2 million pair in 1932.

By the creation of a home machine construction and raw material base for light industry the fundamental problem of the further growth of light industry has been solved during the First Five-Year Plan period. Its further rapid development during the second Five-Year Plan period has been ensured.

The Five-Year Plan of the food industry was carried out both through the extension and basic re-equipment of the old branches of this industry and through the creation of new branches. How far the reconstruction of this industry has gone is shown by the fact that the value of the output of its new branches amounted in

1932 to 38 per cent of the value of all the output of the industry managed by the Commissariat of Supply.

The technical reconstruction which has been carried out in the food industry and which has ensured the mass factory production of various food products has transformed the former technique of production to such an extent that, in relation to the fishing, canned goods and meat packing industries and in relation to the factory kitchens it would be more correct to speak not of their being reconstructed but of their being created entirely anew. For the first time, such branches of the industry were organized as the production of margerine, poultry dressing, dairies and combined fodder. An idea of the technical progress made in this field can be gained from the following data.

In 1928, the fisheries had 19 trawlers at their disposal, in 1932 they had 78 of them; in 1928 there were no seiners, in 1932 there were 66; the number of other motorized units in the fleet of the fishing industry rose from 60 in 1928 to 224 in 1932. There was also considerable progress in the establishment of radio communication (the number of radio-equipped craft increased from 32 in 1928 to 146 in 1932), which ensures the normal work of fishing boats in open sea. The growth of the technical equipment of the fisheries has considerably increased the proportion of deep water fishing which, in 1932, comprised 25.3 per cent of the whole catch.

At the beginning of the first Five-Year Plan period, there were only twenty-two enterprises in the canning industry, with primitive equipment and a capacity of 100 million cans a year. At the beginning of the second Five-Year Plan period the number of enterprises in the canning industry was forty-eight with a capacity of one billion cans a year, ten times as much as in 1928. In the newly built canning plants all work processes are mechanized and production is organized on the conveyor system. All plants are provided with automatic and semi-automatic lathes for rolling cans, with a capacity of from 1,500 to 4,000 cans an hour.

At the beginning of the first Five-Year Plan period, there was no large-scale meat packing industry in the U.S.S.R. Up to recently, meat packing was the most backward branch of industry, with slaughter houses of the old type predominating, with no refrigerating equipment, with no departments for the utilization of by-products. During the first Five-Year Plan period, ten big meat packing combines were organized; new departments (for fat products, sausage production, bristles, etc.) were added to many of the old plants. As a result of this, the utilization of the weight of cattle on hoof, which in the old type slaughter houses comprised about 55 per cent, rose to 66 per cent in the new plants; in some plants even to 75. Since the end of 1931, the construction of meat packing plants of the American type with the latest technical equipment was started, which makes it possible, on the one hand, to improve the quality of the meat and, on the other hand, to raise the coefficient of the utilization of the weight of cattle on hoof.

Of the newly created branches of the food industry, the creation of mechanized enterprises for public catering (such as factory kitchens, mechanized restaurants, etc.) deserves particular attention, as these enterprises play an important role in raising the standard and improving the food conditions of the toiling masses. The operation of this branch of the food industry is dealt with in greater detail in the chapter on public catering.

In tsarist Russia light and food industries were limited to a few regions in the European part of the empire. In the frontier regions and in the regions inhabited by national minorities there was practically no industry whatsoever. As a result of this an enormous part of the resources of raw material remained unused or was exported to the central regions of the country.

The industrialization of the frontier regions and of the backward regions of national minorities is one of the most important tasks of the socialist industrialization of the U.S.S.R. Accordingly, the development of light and food industries during the first Five-Year Plan period was accompanied by considerable changes in their geographic distribution. Among the industrial enterprises which have been built or which are being completed in the republics of the national minorities and in the remote frontier regions there are: great textile combines, clothing factories, meat packing combines, shoe and leather factories, scores of sugar refining plants, canning plants, flour mills, starch and molasses plants, confectionery factories, etc.

As a result, the republics of the national minorities are at present furnishing a considerable portion of the output of light and food industries in the U.S.S.R.

AGRICULTURE

TOWARD the beginning of the first Five-Year Plan period, the characteristic feature of agriculture in the Soviet Union was the overwhelming predominance of small and very small individual peasant holdings.

The average area of cultivation of the individual holdings, which at that time occupied 97.3 per cent of the total sowing area, amounted in 1928 to 4.5 hectares; and as far as the average area of cultivation of the holdings of poor and middle peasants (exclusive of the sowing area of the *kulak* holdings) is concerned, this average drops to 4.03 hectares.

Up to the beginning of the first Five-Year Plan period, the small size of the majority of farms, the primitive means of production, the low level of agricultural technique held back the development of agriculture and rendered difficult its transition to new machine technique.

The level of technical equipment of the rural districts toward the beginning of the Five-Year Plan period may be seen from the following data:

Technical Equipment of Agriculture in 1928

	Millions of hectares	Percentage of total area
Ploughing for spring sowing with wooden ploughs	8.1	*9.8*
Spring sowing done by hand	61.2	*74.4*
Harvesting of grains with sickles	14.3	*15.5*
Harvesting of grains with scythes	26.6	*28.9*
Threshing of grains with flails	12.0	*13.0*
By other manual methods	25.5	*27.7*

The extreme backwardness of agriculture determined by the predominance of small-scale peasant farming checked the pace of the industrial development of the country and put forcefully to the foreground the question of the ways of further development of agriculture.

The creation of a socialist industry capable of reorganizing agriculture, the wide extension of co-operatives, the organization of State farms serving as models of large-scale socialist farming, the sharp rise of Soviet Government aid to the rural districts in the matter of new technique, tractors and machinery, the financial support to the creation of socialist farming, the policy of decisive struggle against the *kulak* class have determined the "radical change in the development of our agriculture from the small, backward, *individual* peasant farming to large-scale advanced *collective* agriculture, to the common cultivation of the land, to machine and tractor stations, to *artels* and collective farms based on a new technique, and, finally, to the giant State farms, equipped with hundreds of tractors and combines." (Stalin.)

The Fifth Congress of Soviets gave its approval to "the program mapped out by the Five-Year Plan providing for doing away with the backwardness of agriculture, raising its productive forces in full accordance with the rapid industrial development of the country, decisively abolishing the *kulak* stratum in the countryside and passing to socialization of agricultural production on a mass scale (the establishment of State farms, collective farms, machine and tractor stations, the faster pace of the development of co-operatives, contract system, etc.), which alone can secure for the many millions of poor and middle peasants the entrance upon a new road of economic prosperity and socialist reconstruction of the individual peasant agriculture." The Congress pointed to the "wide establishment of the socialized sector of agriculture (State and collective farms), which ought to embrace over 20 million of the peasant population and provide at the end of the Five-Year Plan period about 43 per cent of marketable grain."

Actually, the program mapped out by the Five-Year Plan in the sphere of collectivization has been to a large extent overfulfilled. Toward the end of 1932, the collective farms embraced 14.7 million peasant holdings, forming 210,000 collective farms whose sowing area was 75.6 per cent of the total sowing area of the peasantry.

Growth of Collective Farming

	1928	1929	1930	1931	1932
Percentage of holdings in collective farms, in the spring of given year	1.7	3.9	23.6	52.7	61.5
Percentage of total area sown by collective farms	1.2	3.6	30.9	63.0	75.6
Percentage of marketable grain delivered by collective farms to the State (of the total marketable grain of the peasantry)	3.3	10.2	34.3	70.2	77.3
Percentage of total cotton delivered by collective farms (of the total cotton deliveries)	1.86	5.8	26.7	70.5	78.6
Percentage of flax delivered by collective farms (of the total flax deliveries)	—	—	—	56.5	61.8

In 1932 socialized agriculture (State farms and collective farms) supplied 84.2 per cent of the total marketable grain, 83 per cent of cotton, and has played a decisive role in the course of the Five-Year Plan period in the food supply of the country, in the creation of a raw material base for industry and export.

In the course of the Five-Year Plan period, large-scale farming became the prevailing and dominant form of agriculture in the Soviet Union. The U.S.S.R. has become a country of the largest-scale farming in the world.

Proportion (of total) and average size of agricultural units by sectors (types of farming)

	1928		1932	
	Percentage of total sowing area	Average area per unit in hectares	Percentage of total sowing area	Average area per unit in hectares
Individual peasants	*97.3*	4.5	*22.0*	3.15
Collective farms	*1.2*	42.0	*68.0*	434.0
State farms	*1.5*	544.0	*10.0*	2,303.0

In the course of the Five-Year Plan period, the State and collective farms have concentrated the bulk of the total sowing area, increasing their proportion of the total sowing area from 2.7 per cent in 1928 to 78 per cent in 1932. At the same time a considerable increase has also been brought about in the average size of the sowing area of the State farms and the collective farms. Toward the end of the Five-Year Plan period the sowing area of the collective farms comes near the average sowing area of the State farms at the beginning of the Five-Year Plan period, while the average sowing area of the State farms has increased more than four-fold since the beginning of the Five-Year Plan period.

The transformation of the agriculture of the Soviet Union into large-scale socialist farming has been accomplished within a very short period of time, as is shown by the following data:

Length of membership in collective farms in the spring of 1932	Number of peasant households in millions	Percentage
Up to 1 year	1.8	*12.3*
1 to 2 years	7.0	*47.6*
2 to 3 years	4.9	*33.3*
Over 3 years	1.0	*6.8*

The *artel* has become the basic form of the collective farms organized in the course of the Five-Year Plan period.

Proportion of Collective Farms of Various Forms

	1928	1931
	(In percentage)	
Co-operative organizations for joint cultivation of land	*59.8*	*4.7*
Artels	*34.8*	*91.7*
Communes	*5.4*	*3.6*

A characteristic feature of the associations for the joint tillage of land* was the small percentage of socialization of the basic means of production. Thus, in 1928 when this form of co-operation was predominant in the collective farms, the proportion of the socialized sowing area amounted to 54.3 per cent, of draught animals—27.1 per cent, *i.e.*, almost a half of the sowing area and three-quarters of the draught animals were used individually by the peasants.

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* 1. Associations for the joint tillage of land are organizations in which the means of production are not socialized but in which the land is cultivated by the joint labour of the members of the association.

2. Agricultural *artels* socialize the basic means of production: labour, land, machinery and implements, work animals, farm buildings. Land adjoining the homes (small garden and vegetable plots), dwellings, a certain part of dairy cattle, hogs, sheep, poultry, etc., are not socialized.

3. In an agricultural commune both all the means of production and the distribution are socialized.

The transition to the *artel* form meant the collectivization of the entire field area of cultivation and the socialization of the draught animals. At the same time, while conducting a campaign on behalf of the *artel* form, the Communist Party and the Government waged a decisive struggle against excesses in the direction of socializing small farm-stock and large stock not intended for sale. The *artel* and the marketing stock-breeding and dairy farm are now the basic form of the collective farms.

In 1932 the collective farms were the chief producers in every branch of agriculture, and in some branches the collective farms in 1932 had considerably larger sowing areas than all the individual peasants had at the beginning of the first Five-Year Plan period.

Sowing areas of collective farms in 1932 and of individual peasants in 1928

	Grain	Cotton	Sugar Beet	Flax
	(in thousands of hectares)			
Total sowing area of individual peasants in 1928	91,076	956	568	1,344
Sowing area of collective farms in 1932	69,110	1,433	1,107	1,594
Sowing area of collective farms in 1932 in percentage relation to area of individual peasants in 1928 . . .	*76.0*	*150.0*	*195.0*	*118.0*

Thus, the 210,000 collective farms, embracing 61.5 per cent of the entire number of peasant holdings (14.7 million households) and about 60 per cent of all the draught animals, sowed in 1932 three-quarters of the grain area, one and a half times the cotton area, almost twice the area of sugar beets and more than the area of flax as sown in 1928 by all of the 24.5 million individual holdings. In 1932 the collective farmers sowed 91.6 million hectares as against 63 million hectares sown by the same peasants before they entered the collective farms. The collective farms took over about 12 million hectares of the 15 million that were cultivated by *kulak* holdings at the beginning of the Five-Year Plan period, in addition to 8 million hectares constituting the reduction of the total area of the individual peasants and from the general extension of the sowing area by 21.4 million hectares, they put under cultivation 9 million hectares of virgin soil.

This extension of the area of cultivation was a result both of the increase in the productivity of peasant labour due to the transition to collective production and of the more efficient utilization of draught animals and farm implements in the collective farms, coupled with the enormous aid rendered to the latter by the Soviet Government by way of supplying them with complicated machinery and tractors.

Number and power capacity of tractors in agriculture

Date	Number of tractors	Total power in thousands of h.p.	Average power per tractor in h.p.
Oct. 1, 1928	26,733	278.1	10.4
Jan. 1, 1933	148,480 *	2,225.0	14.9

During the first years of the Five-Year Plan period, import accounted for a considerable portion of the tractors placed at the disposal of agriculture. The construction of the tractor department of the Red Putilovetz Works and of the Stalingrad and Kharkov tractor plants made it possible in 1932 to supply the State farms and the collective farms with exclusively Soviet-made tractors. In the course of the first Five-Year Plan period, agriculture received 153,900 tractors, of which 94,300 were Soviet made.

Supply of Tractors for Agricultural Needs

	Total		Percentage of annual supply of Soviet-made tractors	
Year	Number tractors	Capacity in h.p.	Number of	Capacity in h.p.
1927-28	3,334	34.5	*25.5*	*24.6*
1928-29	9,465	126.0	*29.6*	*23.4*
1929-30**	39,242	634.9	*35.9*	*23.1*
1931	59,130	964.4	*52.9*	*40.7*
1932	46,068	678.9	*100.0*	*100.0*

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* Allowing for depreciation.

** Including the number of tractors supplied during the special quarter (last quarter of 1930).

The introduction into agriculture of tractors made at the Stalingrad and Kharkov plants raised the average power per tractor from 10.4 h.p. to 14.9 h.p.

A characteristic feature of the process of reconstruction of agriculture in the U.S.S.R. is the sharp increase during the years of the Five-Year Plan period in the number and proportion of mechanically driven machines. In 1927-28 the share of such machines was 4.6 per cent, whereas in 1932 it rose to 84 per cent. This brought about a radical change in the composition of machines and implements used in agriculture.

Agricultural machinery supplied to the countryside

Type of machines	Millions of rubles		Share of tractor-drawn machinery of Soviet make
	1927-29	*1932*	*1932*
Soil-cultivation machines	38.2	53.6	90.8
Sowing and planting machines	8.1	22.6	80.0
Grain harvesting machines	44.9	97.5	85.7
Including combines . . .	—	63.4	100.0
Threshing machines . . .	27.1	37.7	97.3
Machines for technical crops			
For sugar-beets	—	4.3	44.0
For cotton	—	11.8	100.0
For maize	—	4.5	69.8
For potatoes	—	7.8	12.6
For flax and hemp . . .	0.6	15.3	88.8

At the beginning of the Five-Year Plan period, the bulk of the machinery made available for agriculture consisted of machines used in the production of grains. Toward the end of the Five-Year Plan period, the Soviet industry, in addition to mastering the production of complicated tractor-drawn machinery for the growing of grain, also created the manufacture of machinery for technical crops and in this way established a firm base of modern technical equipment for every branch of agricultural production.

For the purpose of mastering the new mechanized technique of large-scale socialist agriculture, tens of thousands of workers and collective farmers have received and are receiving instruction and training in colleges, universities and technical schools, while hundreds of thousands and millions have gone and are going through courses in order to raise their skill and qualifications. In 1932 the number of students in agricultural colleges was 57,700 as compared with 27,300 in 1928. In the agricultural technical schools and secondary vocational schools, 199,800 students received instruction in 1932 as compared with 62,800 in 1928. Finally, the courses of mass training in skilled work were attended in 1932 by 4.5 million persons. To this army of persons fitting themselves for skilled work in agriculture must be added the 53,000 organizers and directors who received their special education during this period.

The basis of the technical re-equipment of agriculture during the first Five-Year Plan period was its tractorization and mechanization, the construction of a new type of building for housing cattle, the need of which arose in connection with the development of large scale socialized stock-breeding and dairy farming in the State farms and in the collective farms, and in connection with irrigational and ameliorative enterprises—incidental to the opening up of new areas.

As a result of the enormous investments, the fixed capital of agriculture has greatly risen during the years of the first Five-Year Plan period. Thus, the value of the dead inventory which in the beginning of 1928 amounted to 2,679 million rubles rose to 4,286 million rubles toward the end of the Five-Year Plan period, while the value of the dead inventory in the socialized sector increased from 169.5 million rubles to 3,090 million rubles for the same period.

The value of agricultural machinery and tractors which in the beginning of 1928 amounted to 1,099 million rubles grew at the end of 1932 to 2,380 million rubles. The value of irrigational and ameliorative engineering constructions (not counting the expenditures of the collective farmers and individual peasants) rose from 827 million rubles to 1,544 million rubles.

The need of additional irrigated areas for the extension of the sowing areas of cotton demanded a new type of irrigational engineering, the reconstruction of the older engineering works, the intensive building of small irrigational systems and the mastery of newly ploughed lands. In the course of the first five years, the irrigated cotton regions increased the irrigated land by 650,000 hectares at an expenditure of 840 million rubles.

During the years of the Five-Year Plan period, agricultural buildings of a new type have been constructed on a vast scale. Cattle-yards for largescale stock breeding, thousands of silo-towers introduced for the first time in the U.S.S.R., new modern devices for conveying water to cattle-yards, garages and repair shops of a factory type, the erection of farm buildings on State farms, the machine and tractor stations and the collective farms—all this has brought into being new types of agricultural buildings and has vastly increased the number of available buildings in the Soviet countryside. The value of buildings for agricultural purposes increased during these years from 5,072 million rubles to 6,207 million rubles, and for the socialized sector—from 116 million rubles to 1,853 million rubles at the end of the Five-Year Plan period.*

The introduction of new machines and farm implements, during the years of the Five-Year Plan period, raised the equipment of the collective farmers to a new high level both as to the volume and the technical quality of the means of production.

Equipment per agricultural unit

	Inventory	Farm machinery
	(in rubles)	
Poor and middle peasant holdings in 1928	85.87	30
One collective farm household in 1932 . .	138.4	72.8

The above table shows that the holdings joined in the collective farms are already equipped with means of production to the extent of 60 per cent above the previous value of the total inventory per holding and almost two and a half times the value of agricultural machinery per holding, as compared with the time when these holdings were individually operated.

A distinguishing feature of the power equipment of agriculture during the first Five-Year Plan period is the concentration of tractors and modern machinery in the State farms and machine and tractor stations. Prior to the first Five-Year Plan period the tractors in the collective farm sector were scattered among the separate collective farms. According to the collective farm census of June 1, 1929, of the collective farms possessing tractors, 85 per cent had one tractor each, 14.6 per cent had from two to five tractors and only 0.4 per cent of the collective farms had more than five tractors each. In 1932 the fleet of tractors was concentrated in the large mechanized units which ensured its most effective utilization. Of the total number of tractors in agriculture, the machine and tractor stations have 52 per cent and State farms, 42 per cent.

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* These preliminary data on the value of fixed capital in agriculture are computed on the basis of the fixed prices of 1926-27.

By the definition given in *The Five-Year Plan* (Vol. II, Part 1. p. 276), the machine and tractor stations were to be "the electrification program *(Goelro)* for rural economy." But the Five-Year Plan mapped out a very modest program of machine and tractor stations, though at that time even that scope seemed quite imposing. "The Five-Year Plan proposes for the machine and tractor stations to embrace a total area of 3 million hectares of individual peasant sowing areas, but this is only the beginning of a great plan calculated to embrace 25 million hectares of plough land in the course of ten years." *(Ibid.,* p. 277.) But already in 1931, *i.e.,* only three years later, the machine and tractor stations embraced a sowing area of 32 million hectares. In 1932, of the total sowing area of the collective farms amounting to 91.6 million hectares, the machine and tractor stations sowed 50 million hectares, or 54.8 per cent of the total sowing area of the collective farms and 42 per cent of the total peasant sowing area.

In 1932 the machine and tractor stations in the main producing regions embraced more than half of the sowing area of the collective farms and no less than half the entire peasant area of cultivation.

Republics, territories and regions	Percentage of total area of collective farms embraced by machine and tractor stations	Percentage of total peasant sowing area embraced by machine and tractor stations
Northern Caucasus .	73.9	67.3
Ukrainian S.S.R. . .	70.8	56.1
Middle Volga	56.3	50.2
Lower Volga	57.1	55.1
Central Black Earth Region	60.3	43.8
Central Asia	90.6	57.6

In 1932 the machine and tractor stations already embraced more than half of the grain area and the bulk of the area of technical crops.

Percentage of the total area of cultivation of the collective farms served by the machine and tractor stations in 1932

	Per cent
A. Sowing area of all crops	54.8
Of these:	
a) Spring crops in 1932	52.8
b) Winter crops in 1932	59.9
B. Grain areas	53.0
Of these:	
a) Spring crops in 1932.	49.0
b) Winter crops in 1932	59.9
C. Cotton	90.7
D. Sugar beets	81.4
E. Long-fibre flax	36.1

The machine and tractor stations created the possibility for the considerable growth of the production of the collective farms, having increased their equipment with machinery and implements by an amount which exceeds the value of the machinery and equipment which the collective farms had before the machine and tractor stations were organized. At the end of 1932 the value of machines, implements and tractors belonging to the machine and tractor stations equalled 538 million rubles, while the value of equipment of the same group belonging to the collective farms served by these machine and tractor stations at the same time was 327 million rubles. The machines and tractor stations have been serving the collective farms as a base for the reconstruction of collective farming along the lines of modern machine technique and scientific farming.

The machine and tractor stations represent a new form of organization of socialist production in agriculture. Introducing machine technique in the rural districts on a wide scale, combining tractor draught power and modern machinery with draught animals and peasant inventory, the machine and tractor stations are creating the conditions for the more efficient utilization of the latter and are systematically substituting modern means of production in place of peasant inventory.

The co-ordination of the work of the tractor with that of the horse has acquired great importance in the economy of the collective farms. According to the data concerning the average utilization per peasant horse in 1928, the horses in the possession of the collective farms could cultivate only about 50 million hectares in 1932. In conjunction with the work of the tractors the productive utilization of the horse rose to 175 per cent of the average utilization in 1928. The tractors, on their own account, did the work of 2.5 to 3 million horses. Thus the volume of work accomplished on the fields of the collective farms in 1932 would demand more than double the number of horses, on the basis of the average productive capacity per peasant horse in 1928.

The problem of insufficient utilization of the horse in individual peasant farming, particularly in the case of the middle peasants, which was acute under the system of small scale peasant farming, has found its solution with the organization of the collective farms.

The tractor has increased the power resources of agriculture and has at the same time served as a basis for increasing the power resources of agriculture through the more efficient utilization of horses.

The machine and tractor stations are at the present time a decisive factor in the socialist re-education of the collective farmers, in creating a new labour discipline, the discipline of socialist large-scale production. The machine and tractor stations have become a most important lever in the hands of the proletarian State for the purpose of accomplishing the teaching of Engels that in the process of transition to socialist economy in agriculture "matters must be so arranged that society, *i.e.*, in the first stage—the state—retains the ownership of the means of production, and that in this way the private interests of the co-operative association could not prevail over the interests of society as a whole." (Marx-Engels Archives, Vol. I/VI.)

The Five-Year Plan mapped out the development of production by State farms upon an area of 5 million hectares including 3.8 million hectares under grain. But the sowing area of the State farms, which in 1928 amounted to 1,735,000 hectares, rose in

1932 to 13.5 million hectares, including 9.3 million hectares under grain. The Five-Year Plan of the construction of State farms has been overfulfilled more than two and a half times. During this period the State farms grew into powerful mechanized agricultural organizations.

In 1928 tractors accounted for 51.7 per cent of the total draught power of the State farms. In 1932 the draught power of the tractors rose to 67 per cent of the total draught power of the State farms.

In accordance with the growth of the number and capacity of tractors, the measure of mechanical draught power per worker on the State farms rose from 0.14 h.p. in 1928 to 0.58 h.p. in 1932, that is, more than four-fold (414 per cent). The mechanization of the State farms ensured a considerable increase of the productivity of labour in the State farms. In 1928 the harvesting area per worker amounted to 3.04 hectares whereas in 1932 it rose to 7.07 hectares per worker, that is—almost two and a half times as much.

Though they have concentrated a mighty fleet of tractors and a corresponding quantity of machinery, the State farms, nevertheless, did not succeed in co-ordinating fully, during the years of the first Five-Year Plan period, modern machine technique with the scientific requirements of large-scale production. The need of training and raising the skill of the greatly increased number of workers on the State farms, most of whom had had very little knowledge of modern agricultural machinery; the need of devising methods and forms of carrying on large-scale socialist economy and of training its organizers; wrecking and the fierce resistance of the class enemy which sprang up in connection with mastering the machinery and the method of scientific work on the State farms—all this rendered difficult the mastering of the technique of large-scale farming on these farms, and their yield has not yet reached the level that should correspond to their powerful technical equipment.

In the course of fulfilling the Five-Year Plan, the Government introduced a very important correction in the work of developing cattle-breeding and dairy State farms. The Five-Year Plan assumed that "if in the realm of field cultivation the role of the State farms increase considerably by the end of the Five-Year

Plan period, this cannot be said about stock-breeding." Accordingly, this plan provided for "a slow development of stock-breeding in the State farms."

During the Five-Year Plan period socialist large-scale stock-breeding was organized. The most capacious stock-breeding farms are State farms under the Commissariat of Agriculture. Thus, at the end of 1932 the dairy and meat State farms of the above-mentioned system had 2.1 million head of large horned cattle, including 981,000 cows; the sheep State farms had 4.4 million sheep while the hog-breeding State farms had a herd of 950,000 hogs.

The development of the stock-breeding farms has greatly raised their relative importance in the total marketable production of products of stock-breeding.

The relative importance of the State farms in the centralized collections of products of stock-breeding (in percentages)

	1928	1932
Meat and bacon	1.0	13.1
Milk and dairy products	6.4	23.5
Wool	5.6	30.0

Along with the large-scale stock-breeding in the State farms, large scale socialized stock-breeding also developed in the collective farms, in the form of 132,000 cattle-breeding and dairy collective farms at the end of 1932. These farms at the end of the Five-Year Plan period had a herd of 5.5 million large horned cattle, 2.6 million hogs and about 5.8 million sheep. The incubators of the collective farms had 3.6 million head of fowl.

The establishment of large-scale agricultural production in the U.S.S.R. and its equipment with new machinery implements and power resources ensured an increase of 21.4 million hectares in the area of cultivation during the Five-Year Plan period.

The extension of the sowing areas was accomplished mainly by breaking new areas in the southern and eastern regions, which account for 15.1 million hectares of new sowings.

The geographic distribution of the increase in the sowing areas during the first Five-Year Plan

Region	Increase during 1928-32 in thousands of hectares	Percentage of total increase	Increase in State farms (in thous. of hectares)	Increase in State farms in percentage
Northern and Central Regions (Northern territory, Leningrad region, White Russian S.S.R., Western, Moscow, Ivanovo Regions, Gorky territory, Tartar Republic)	4,518	21.1	1,140	25.2
Southern Regions (Ukr. S.S.R., Central Black Earth Region, Middle and Lower Volga, Northern Caucasus, Crimea)	11,651	54.3	6,801	58.4
Eastern Regions (Urals, Bashkiria, Kazakstan and Karakalpakia, Western and Eastern Siberia, Yakutia, Far-Eastern Territory)	3,477	16.2	3,290	94.6
Central Asia and Transcaucasia (Uzbekistan, Turkmenistan, Tadjikistan, Kirghizia, Transcaucasian S.F.S.R. . . .	1,796	8.4	482	26.8
Total for U.S.S.R.	21,442	100.0	11,713	59.3

A considerable part of the total increase in the sowing areas, namely, 7.5 million hectares, or 35.2 per cent consists of grain areas. The area under wheat increased by 6.9 million hectares amounting to 92 per cent of the total increase in grain areas.

The area under technical crops was increased by 6.26 million or by 72.7 per cent compared with the technical crop area before the Five-Year Plan period. The area of forage crops increased considerably (135 per cent).

Increase of Sowing Area by Crops

Crop	Increase during 1928-32 in millions of hectares	Percentage of total increase	Percentage of increase in relation to area of 1928
Grain	7.5	35.2	8.2
Of this:			
Spring and winter wheat	6.9	32.2	24.9
Technical crops	6.3	29.3	72.7
Of this:			
Cotton	1.2	5.6	123.8
Long fibre flax . .	1.1	5.3	84.0
Sugar beet	0.8	3.8	108.5
Vegetables and melons	1.5	7.1	19.9
Forage	6.1	28.4	135.1
Of this:			
Grasses	4.7	21.7	31.3
All crops	21.4	100.0	18.9

The Five-Year Plan has in the main solved the grain problem by organizing on a vast scale the production of grain by State farms and collective farms, by equipping it with modern machinery and tractors and by increasing the grain-sowing area. On this basis a qualitative improvement in the grain production has also been achieved. A considerable increase took place in the share of wheat (spring and winter) in the total grain production. This has increased from 30.1 per cent in 1928 to 34.7 per cent in 1932. The sowing areas of winter wheat in 1932 increased in the Ukraine 21.4 per cent compared with 1927, in Northern Caucasus 31.6 per cent compared with 1928.

The first Five-Year Plan has brought about great achievements in the realm of extending the raw material base of light industry and in the cultivation of new technical crops.

The sowing area under cotton has increased from 971,000 hectares in 1928 to 2,172,000 hectares in 1932. During the Five-Year Plan period new cotton regions were developed in Turkestan and Transcaucasia. During the same period cotton cultivation was developed in the non-irrigated regions of the Ukraine, Northern Caucasus, Crimea and Lower Volga.

The percentage of new cotton regions increased from 0.23 in 1928 to 19.7 in 1932. Despite the increase in its cotton area of 72.4 per cent, the share of Central Asia in the total cotton areas fell from 81.6 in 1928 to 61.3 in 1932. In the production of fibre crops Central Asia has retained its dominating position, having delivered 80.7 per cent of the total cotton crop in the U.S.S.R. in 1932, as against 86 per cent in 1928.

During recent years the cotton industry received twice as much Soviet-produced cotton as was produced in Russia 1913. By 1931 the U.S.S.R. had already extended its cotton-textiles industry on the basis of home-grown raw materials and emancipated itself from cotton imports, which before the war reached 200,000 tons and in 1928 amounted to about 144,000 tons.

As a result of this enormous growth of cotton raising during the first Five-Year Plan period, the position of the U.S.S.R. among the cotton-growing countries of the world has risen considerably.

Cotton areas of the U.S.S.R. and capitalist countries

(in thousands of hectares)

Countries	1928	1932	1932 in percentage relation to 1928
U.S.S.R.	971	2,172	223.7
Capitalist Countries *	34,610	29,551	85.4
U.S.A.	18,349	15,212	82.9
India	10,948	9,045	82.6
Egypt	730	459	62.9

Along with the increase in the growing of cotton, favourable conditions have been created for the growing of the very valuable Egyptian cotton. At the beginning of the Five-Year Plan period we had hardly a hectare of Egyptian cotton, but in 1932 the area under Egyptian cotton already amounted to 51,000 hectares.

During the Five-Year Plan period the production of cotton underwent a veritable revolution in its technical organization and equipment. The first machine and tractor stations, nineteen in number, were established in the cotton regions in 1930. In 1932 their number grew to 214. As a result of this the tractor has been more used in cotton growing in the U.S.S.R. than in the United

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* *Bulletin Mensuel de Statistique Agricole et Commerciale*, No. 2, 1933.

States. In the thirteen cotton-producing states of the U.S.A. the cotton area per tractor amounted to 258 hectares, while in Central Asia in 1931 it was 175 hectares, and in the districts served by machine and tractor stations—136 hectares.

The wide use of tractor-drawn and horse-drawn implements in cotton growing during the last two or three years has brought about a radical change in the technique of cotton-raising, having crowded out almost completely the formerly prevalent antediluvian hand implements. Thus, tractor-drawn and horse-drawn implements were used in 1929 in cultivating 13.7 per cent of the cotton area, while in 1931 the percentage rose to 72. The problem of mechanizing the harvesting of cotton has not yet been fully solved, yet about two thousand cotton pickers and a great number of experimental machines are already solving this difficult problem on the cotton fields.

The development of another textile crop, flax, during the first Five-Year Plan period expressed itself first of all in the extension of the sowing area from 1,364,000 hectares to 2,510,000 hectares, and also in the increase of the harvest, together with a radical improvement in the technique of flax harvesting and of its primary treatment. Fifteen thousand flax harvesting machines—"Komsomolka"—have been made available for the mechanical harvesting of flax, and these together with the newly designed large size flax pulling machine constitute the basis of the technical revolution in flax growing. In 1928 there were only eighteen plants for the primary treatment of flax. Their role in the commodity production was insignificant. Hand treatment was the principal method of flax treatment. At the beginning of 1933 there were in operation already 350 plants for primary flax treatment. Soviet industry has equipped these plants with machinery of domestic make.

During the Five-Year Plan period the cultivation of a number of new technical crops was introduced securing the country's emancipation from import or the reduction of the import of some of the most important types of raw material.

Sowing areas in thousands of hectares

Crops	Before the war	1928	1932
New bast yielding crops . .	—	12.0	104.0
Ether-oil and medicinal crops	7.4	8.0	153.0
Soya	—	48.5	299.8
Tea	0.9	1.8	26.5

The fibre of the new bast crops transformed by means of debarking and cottonization into refined fibres (cottonine) has already provided a new raw material for the textile industry. The new bast crops are supplanting jute and manila hemp. The production of stalks of bark plants has in 1932 reached 26,000 centners, valued at 10.9 million rubles. The harvest of green tea leaves increased to 26,000 centners in 1932.

These are only the first steps in the wide development of the cultivation of new crops in Soviet agriculture which emancipate the country from dependence upon import as far as high-priced crops are concerned.

Note must also be made of the considerable increase in the production of vegetables during the Five-Year Plan period. In 1932 vegetable plots covered 2,235,000 hectares as compared with 800,000 hectares in 1928-29. The State and collective farms have at the end of 1932 accounted for 62 per cent of the total vegetable plots. This growth of the potato and vegetable areas was particularly great in the suburban zones, where the vegetable plots of the consumers' co-operatives alone amounted to 466,800 hectares in 1932. More than half of the increase in the potato and vegetable areas in the suburban zones is accounted for by newly cultivated land.

Along with this, there has been a wide development of hothouses. In pre-revolutionary Russia, covered vegetable plots amounted to 400 hectares and about 1.2 to 1.5 million frames. In the U.S.S.R., hothouse vegetable growing reached in 1932 an area of 1,300 hectares (about 3.3 million frames).

* * *

The enormous range of the socialist reconstruction of agriculture required the financial aid of the proletarian State for the new socialized production established in the Soviet countryside.

During the period of four and a quarter years the total financing of the planned enterprises in the collective farms and the machine and tractor stations amounted to 4.7 billion rubles, including 3.2 billion rubles in the collective farms and 1.5 billion rubles in the machine and tractor stations.

In order to carry out this gigantic plan of reconstruction, the State assisted the collectivized countryside to the extent of 3 billion rubles and the resources of the collective farms and machine and tractor stations were mobilized to the amount of 1.7 billion rubles. Thus, 65 per cent of all the financing of planned work in the collective farms and machine and tractor stations constitutes the assistance of the proletarian State in the radical socialist reconstruction of the countryside.

The years of the first Five-Year Plan period were years of socialist transformation of agricultural production in the U.S.S.R. Small-scale individual peasant farming, which was prevalent in agriculture on the eve of the Five-Year Plan period, has been transformed into collective farming. The *kulak* class with its rapacious exploitation of the countryside has been smashed. The mass of poor peasants and weak middle peasants has been freed from *kulak* bondage The possibility of the differentiation of the peasantry into exploiting *kulaks* and exploited poor peasants has been eliminated. Poverty and pauperism in the countryside have been destroyed. The poor peasants who entered the collective farms have already raised their standard of living to that of the former middle peasants.

In the conditions of tsarist Russia small-scale peasant farming was subject to the double, despotic oppression of capitalist and feudal landlords. The bulk of the peasantry were under the constant threat of ruin and clung desperately to their little plots of land. The transformation of a small producer into a worker of a large-scale socialist enterprise demanded new forms of organization and new socialist discipline of labour. Considerable success has been achieved in creating the new socialist discipline of labour. The growing power of Soviet industry, the consolidation of the system of collective farming, the strengthening of labour discipline, the gradual disappearance of the petty owner's individualistic psychology—all this ensures the further developing of a communist attitude to labour. Socialism has solved the question of establishing large-scale agricultural production on the basis of modern machine technique not by the ruin of millions of peasants but by raising their level of well-being, by overcoming the idiocy of rural life, by bringing to millions of scattered, broken-up peasant holdings the benefits of social forms of production and by creating conditions for the decisive overcoming of the backwardness of agriculture. In order to solve this problem within the shortest possible historical period, the enormous material and financial aid which the Soviet State gave for the purpose of establishing a new social order in the countryside was necessary, as well as the aid on the part of the proletarian cadres of organizers of large-scale socialist agriculture.

Thanks to this assistance on the part of the proletarian city in the socialist transformation of the countryside, the development of agriculture has already, in the conditions of the reconstruction of the countryside, displayed the exceptional advantages of socialist production in agriculture, the tremendous possibilities contained in socialist agriculture.

The socialist reconstruction of small-scale peasant farming has taken place in an atmosphere of sharpened class struggle. The Right wing opportunists and Trotskyists launched a struggle against the line of the Party which has been directed towards the creation of a system of collective farming in the countryside and towards the liquidation of kulakdom as a class on this basis. *Kulaks* and wreckers put up a desperate resistance to the general offensive of socialism. The *kulaks* let loose a wave of terror against the organizers of collective production, attempting to disorganize the collective farms through arson and looting. The rout of the *kulaks* forced the enemies of the new social order in the countryside to change to new, more covert forms of struggle against the collective farms. Having penetrated into the collective farms, the *kulaks* and their agents attempted, by means of playing upon the proprietory habits and customs of the erstwhile small producers, to undo the victory of the collective farm system by means of undermining labour discipline in the collective farms, by squandering and stealing collective farm crops, by damaging implements and machinery and destroying collective farm cattle. The determined counter-action to this *kulak* manoeuvre, the mobilization of the advanced collective farmers for a campaign of struggle against everything that tends to demoralize collective production, have raised the labour discipline in the collective farms and are serving as the basis for the accomplishment of the most important task of the second Five-Year Plan—the raising of the quality of collective farm labour, the increase in the yield of the soil.

During the first Five-Year Plan period, the U.S.S.R. has scored decisive successes in overcoming the age-old backwardness of the countryside. The establishment of socialist large-scale production has at the same time raised the technical equipment of agriculture in the Soviet Union to the most advanced modern level. Upon this basis considerable successes have been achieved in the growth of the productive forces of agriculture and its excessive backwardness has been overcome. The grain problem has in the main been solved and the raw material base for light industry has grown considerably.

In having solved the problem of establishing socialist large-scale agricultural production, the Soviet Union has created the conditions for a still greater rise of agriculture and for the complete solution of the problem of assuring sufficient foodstuffs and raw materials for the proletarian city and the collective countryside.

During the Five-Year Plan period, decisive successes have been achieved in overcoming the antagonisms between city and countryside, and a solution has been found for the problem of historical importance, the problem of transferring the national economy of the Soviet Union from its former double base of large-scale socialist industry and small-scale individual peasant production, upon which it rested before the inauguration of the Five-Year Plan, to a socialist form of production both in city and the countryside.

TRANSPORT AND COMMUNICATION

THE Five-Year Plan provided for a broad program of construction in the field of transport, based upon extensive reconstruction of the existing railroads and construction of new railroads; the lack of roads was to be entirely overcome by the building of highways and unmetalled roads on a large scale and by greatly developing various other types of transport (automobile and air). In the field of water transport the Five-Year Plan provided for an improvement of the existing waterways and a further development of the system of river routes to be accompanied by a corresponding development of ship-building.

The fact that the Five-Year Plan for the development of the whole of the national economy was fulfilled in four years made it necessary to introduce a series of amendments into the Five-Year Plan as approved by the Fifth Congress of Soviets, so as to ensure that the transport fulfil its increased traffic tasks, to speed up the tempo of reconstruction of railroad and water transport, to extend the ways of approach to Siberia and the Donbas and create the country's own machine building industry for the reconstruction of the transport.

RAILROAD TRANSPORT

The work of the railroad transport during the Five-Year Plan period is shown in the following table:

	Freight traffic (In billion ton-kms.)			Passenger traffic (In billion passenger kms.)		
Year	According to the Five-Year Plan	Actual Performance	Per cent of Plan	According to the Five-Year Plan	Actual Performance	Per cent of Plan
1928	**—**	**93.4**	**—**	**—**	**24.5**	**—**
1929	**97.0**	**113.0**	***116.5***	**24.5**	**32.0**	***130.6***
1930	**108.7**	**133.9**	***123.2***	**27.0**	**51.8**	***191.9***
1931	**122.9**	**151.9**	***123.6***	**29.7**	**61.8**	***208.1***
1932	**139.8**	**169.3**	***121.1***	**32.5**	**84.1**	***258.8***

The crux of the whole transport problem during the first Five-Year Plan period was the railroad transport. The railroad transport had to bear the brunt of the task of satisfying the increased requirements of the national economy in respect of freight and passenger traffic.

In 1932 the amount of freight carried by the railways reached 181.3 per cent of the amount of freight carried in 1928 and it exceeded the pre-war level by 2.5 times. The number of passengers carried in 1932 was equal to 245 per cent of those carried in 1928. Such a tempo of growth has never been known in the transport of capitalist countries. It took the United States thirteen years (1900-13) to achieve a 78 per cent increase in the amount of freight carried by its railroads.

The tremendous growth of freight traffic was determined by the tempo of growth of the national economy and the industrialization of the country. This found its reflection in the dynamics of growth observable in the various items of freight traffic. While the total freight traffic in 1932 amounted to 171.4 per cent of that of 1928, the shipment of the chief industrial freights (coal, oil, metal, etc.) grew by 200 per cent.

The creation of the second coal and metal base in the East and the industrialization of the backward regions and national republics of national minorities have brought about considerable changes in the direction of the flow of freight. While the total freight turnover (in tons) in the Soviet Union in 1932 amounted to 171.4 per cent of that of 1928, the freight turnover of the Urals amounted to 177 per cent of the 1928 figure, that of Western Siberia to 200 per cent and that of Kazakstan to 300 per cent.

The industrialization of the country and the improvement of the material welfare of the toilers has caused an enormous growth of passenger traffic.

The principal factors in the technical reconstruction of the railroad system during the first Five-Year Plan period were: an increase in the power of the locomotive; an enlargement of the freight car and an increase of its carrying capacity; the strengthening and reconstruction of the road bed; preparations for the introduction of automatic coupling; introduction of automatic brakes for freight trains; the reorganization of the communications service and of the signalling system, which was made automatic; and partial adoption of electric and Diesel locomotive traction.

The increase in the power of the locomotive has been attained by building new locomotives of the E type and by modernizing the existing locomotives. The E locomotive (0-5-0), with a traction power of 16.2 tons, exceeds by more than 75 per cent the power of the O locomotive, which was the type of engine most in use on the railroads of pre-war Russia. During the Five-Year period the Soviet railroads have received 2,666 new freight locomotives of the E type and 288 passenger locomotives of the SU type.

The modernization of the locomotives, the installation of economizers, super-heaters, rocking grates, etc., assured an improvement in the efficiency of the existing engines. The average traction power of an engine in 1932 was 37 per cent higher than in 1913. During the four years of the first Five-Year Plan period the total traction power of all freight engines went up by 35 per cent, thus making it possible considerably to increase the average size of the trains.

The construction of the Lugansk Locomotive Works with a rated capacity of 1,080 powerful locomotives of the FD type (1-5-1), which exceed the power of the E locomotives by 30 per cent, is being completed. The existing locomotives works have also been largely reconstructed during the Five-Year Plan period. A new type of powerful passenger locomotive known as the JS (1-4-2) is also being produced.

The Five-Year Plan provided for an extension of experimental work on the use of Diesel locomotive traction on railroads with difficult water-supply conditions, and for the electrification of a section of the railroad system. During the Five-Year Plan period experiments were made in the use of Diesel locomotive traction in the waterless expanses of Central Asia, new types of powerful Diesel locomotives were designed and their production was started. A number of suburban lines with the greatest quantity of passenger traffic, as well as some mountain sections of the Transcaucasian railroad with heavy gradient (Stalinisi-Zestafoni), have been electrified. At the present time over 1,400 kilometres of the most difficult and congested sections of railroads in the Urals, Donbas and the Caucasus are in the process of electrification.

In the field of the reconstruction of freight cars during the first

Five-Year Plan period, production has been started on large freight cars and special cars such as hopper cars, tank cars, self-dumping cars, etc., while the rolling stock has been modernized and equipped with automatic brakes and brake-pipes.

This reconstruction has affected the proportion between various sorts of freight cars, and the proportion of box-cars, gondola cars and special trucks has increased by 35 per cent.

Railroad transport overfulfilled the freight program of the first Five-Year Plan as a whole, despite the fact that the increase in rolling stock was somewhat below what had been provided for by the Five-Year Plan; this result was achieved by the improved utilization of the existing rolling stock. An idea of what has been achieved in the utilization of rolling stock may be obtained from the following table:

	1932-33 According to the Five-Year Plan	1932 Actual Performance
Average load per axle of freight car (in tons)	4.85	5.3
Percentage of idle run	28.0	26.8
Amount of shipments carried per ton of traction power of freight locomotive (thous. ton-kms. net)	828.0	866.0
Same per ton of carrying capacity of freight engine	15.5	16.7
Freight carried in mill. km. tons per km. of road	1.8	2.03

The growth of the freight and passenger traffic on the railroads and the increase of traffic (ton-kilometres to one kilometre of the railroad system) by 100 per cent as compared with 1928 necessitated the carrying out of considerable construction work in order to raise the capacity of the most congested lines—strengthening the road-bed and constructing stations and yards, laying heavier rails, eliminating the multiplicity of types of rails, increasing the ballast layer, strengthening the bridges, grade revision, lengthening station tracks, building new turnouts and humps and laying a second, third or fourth track on the most important trunk lines. A total of 1.5 billion rubles was invested in these works during the four years of the Five-Year Plan period.

The reconstruction measures carried out during the Five-Year Plan period have enabled the railroad transport to handle shipments far in excess of the capacity of the railroads at the beginning of the Five-Year Plan period.

It is particularly necessary to emphasize the strengthening of the capacity of some of the most important lines which link up the different economic regions of the U.S.S.R.

The Siberian Line has undergone radical reconstruction. Not only have the two railroads, which at the beginning of the Five-Year Plan period linked up the Urals with Siberia through Tyumen and Chelyabinsk, been reconstructed and their capacity increased, but a third railroad has been built, linking up Sverdlovsk with Siberia through Shadrinsk and Kurgan by the reconstruction of the Sinarskaia-Shadrinsk line and construction of a new line between Shadrinsk and Kurgan with a total length of 363 kilometres. The main gradient of the new line is 0.004 instead of 0.009 and the light rails have been replaced by heavy rails. A second track has been laid along the entire route from Chelyabinsk to Omsk, the gradient being reduced from 0.007 to 0.004.

Second tracks have been laid on the lines linking up Krivorozhye with the Donbas (Pyatikhatka-Dolgintsevo), Donbas with the centre, (Kupyansk-Valuiki-Osnova-Lyman), etc.

The following most important stations and junctions have been developed and reconstructed: Yasinovataya and Krassny Lyman in the Donbas, and the ore classification yard on the outskirts of Krivoy Rog; and new railroad stations have been built in Magnitogorsk, Kuznetsk and Karaganda; 36 humps have been constructed, more than 1,500 new turnouts opened, etc.

The total length of the station lines was increased by 8,700 kilometres during the Five-Year Plan period.

Of great importance in increasing the capacity of the railroads has been the reconstruction of the signalling system. At the beginning of the Five-Year Plan period 40 per cent of the total length of line under use was equipped only with telegraph, the oldest method of long distance communication; by 1932, however, the percentage had been reduced to 21. Ten thousand kilometres of line have been newly equipped with the baton dispatcher system which now extends over 53 per cent of the total length of railroad under use.

To increase the capacity of the most congested railroad lines, the Five-Year Plan provided for the introduction of automatic block signalling on experimental sections. During the Five-Year Plan period automatic block signalling was introduced over a distance of 282 kilometres and semi-automatic signalling over 6,600 kilometres. Practically the whole of the railroad system is equipped with the dispatcher system.

All of these measures have increased the capacity of the most important and most congested lines and assured an improvement in the work of the railroads in supplying the main branches of the national economy.

Simultaneously with the reconstruction of the existing lines, the Five-Year Plan also provided for the construction of new railroads and an increase in the system of lines which feed the present trunk lines.

Between 1928 and 1932 building was begun on 14,000 km. of new railroads, of which 6,500 km. were opened during the first Five-Year Plan period.

Much attention has been given to the construction of branch lines which, while often of inconsiderable extent, play an exceptional role in the development of new regions (Khibiny) or of regions already opened up.

Of the 6,500 km. of new railroads opened during the first Five-Year Plan period, about 80 per cent are located in outlying regions and in the republics of national minorities. Among the most important lines which have been opened, we may not the Turkestan-Siberian Trunk Line (1,442 km.), the Troitsk-Orsk Line (398 km.), the Borovoye-Akmolinsk-Karaganda Line, the Leninsk-Novosibirsk Line, etc. Of great importance for the national economy is the construction of the Moscow-Donbas Trunk Line (1,195 km.) now in the process of construction.

In 1932 the total mileage in actual operation in the U.S.S.R. amounted to 83,400 km. as compared with 76,900 km. in 1928 and 58,500 km. in 1913.

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The results of the work of the railroad transport during the first Five-Year Plan period show that the basic task of the plan as regards freight and passenger traffic was successfully fulfilled. The railroad mileage was increased. The Turksib Line, a most important trunk line linking up Siberia with Central Asia, was built. The Moscow-Donbas Trunk Line is under construction. A powerful transport machine building industry has been created. In addition to the building of new powerful engines, the production of Diesel and electric locomotives has been mastered. The rolling stock has been modernized. A system of reconstructed railroad repair shops and special transport repair factories has been created and serves as an important auxiliary base for the transport machine building industry.

WATER TRANSPORT

In 1913, the year of the highest development of the river transport industry in pre-war Russia, the freight turnover of river transport amounted to 48 million tons, of which 34 million tons were carried by power-driven boats and 14 million tons by floating craft. In 1928 river shipments amounted to 40 million tons, of which 26 million tons were carried by power-driven boats and 14 million tons were floated. According to the Five-Year Plan the freight turnover of river transport in 1933 was to reach 45.5 million tons carried by power-driven boats and 32 million tons carried by floating craft. Actually, river shipments in 1932 amounted to 47 million tons carried by power-driven boats and 20 million tons floated. Thus, river shipments by power-driven vessels in 1932 exceeded the figure set by the Five-Year Plan for 1932-33 by 3.3. per cent, amounting to 138 per cent of the 1913 figure and 181 per cent of the 1928 figure.

In passenger traffic the Five-Year Plan was exceeded by 50 per cent.

As regards sea transportation, the Five-Year Plan provided for a freight turnover of 51.9 million tons to be handled by the Soviet ports in 1933. Actually, the 1932 shipments amounted to 49.7 million tons. During the Five-Year Plan period the freight turnover of the ports went up by 92 per cent. Shipments carried by Soviet merchant vessels nearly doubled during the four years of the Five-Year Plan period (15 million tons in 1932 as against 8 million tons in 1928).

At the beginning of the Five-Year Plan period the water transport was among the most backward industries of the country.

During the first Five-Year Plan period notable progress was made in the work of technical reconstruction in this sphere.

Capital investments in the water transport under the Five-Year Plan were to amount to 1,106 million during the entire five years. Actually, 1,233 million rubles were invested during the four years and three months of the plan. The fixed capital of the water transport was more than doubled.

The length of the navigable riverways in use went up from 71,600 km. in 1928 to 84,200 km. in 1932. The length of the equipped riverways increased from 39,900 km. in 1913 to 50,200 km. in 1928 and 68,400 km. in 1932, while the length of the waterways equipped for night sailing increased from 35,900 km. in 1913 to 49,000 km. in 1932.

During the first Five-Year Plan period very great progress was made in the opening up of river ways and sea routes in the far North and the Arctic (the mouths of the Lena, Indigirka, Kolyma and Khatangi rivers). Tremendous progress has been made in the development of arctic navigation. During the last year of the Five-Year Plan period a special expedition demonstrated the possibility of sailing from Archangel to Vladivostok in one season.

In the field of new hydrotechnical construction a number of projects of world importance, both in their scale and in their boldness, have been put into effect. These include the construction of the White Sea-Baltic Canal, the conversion of the Dnieper into a navigable river along its entire length by the building of the Dnieper dam, and the beginning of construction on a canal connecting up the Volga and the Moscow river. It should be noted, moreover, that, the Five-Year Plan provided for only one of these hydrotechnical constructions—for the Dnieper dam.

During the first Five-Year Plan period the existing fleet was not only completely restored but considerable additions were made to it. The power of steamships and motorships composing the river fleet in 1932 was 154 per cent greater than in 1928, while the capacity of river craft not propelled by steam increased by 181 per cent. The tonnage of the navy was more than doubled.

Much progress has been made in the creation of an industrial base for the mercantile marine by the reconstruction and re-equipment of the old wharves and by the building of a number of powerful new ship-building plants. The ship repair yards, the wooden shipyards and the most important wintering and repair docks have also undergone considerable reconstruction during the first Five-Year Plan period. Loading and unloading operations have been mechanized, an extensive system of warehouses, cold storage plants and elevators has been built and a dispatcher telegraph system has been introduced on the water transport. While the size of the river fleet increased one and a half times during the Five-Year Plan period, the tonnage carried was doubled. Soviet river transport has thus surpassed the most highly developed inland navigation system of Germany. In 1928 the total work of the German river transport amounted to 23.2 billion ton-km., but in 1932 it dropped to 17 billion ton-km. The work of the Soviet river transport in 1932 amounted to 26 billion ton-km. Thus, the river transport of the U.S.S.R. has outstripped that of Germany not only as compared with a crisis year but also as compared with the highest point reached by the German river shipping industry. Soviet river transport has thereby captured first place in Europe and second place in the world, being second only to the United States.

AUTOMOBILE TRANSPORT

Before the war the system of roads for vehicular traffic on the territory of what is now the U.S.S.R. was very weakly developed. The total length of all roads fit for vehicular traffic amounted to 24,300 km., of which only 4,823 km. were paved.

As a result of the imperialist and civil wars the roads fell into a bad state of disrepair.

At the beginning of the first Five-Year Plan period, in 1928, the total length of coated roads amounted to 32,000 km. in addition to which there were unmetalled roads of better quality with a total length of 9,000 km.

During the first Five-Year Plan period 93,000 km. of new roads were built, of which about 12,000 kilometres were coated roads. The building of roads by the State was designed, for the most part, for inter-regional communications; only a few branch roads were built. The construction of roads by industrial and agricultural enterprises mainly took the form of roads within the sphere of the given enterprise or of branch roads leading to elevators, railroad stations and wharves.

At the same time the building of roads to open up new regions has assumed considerable importance. The republics of Central Asia, which did not have any regular roads in the past, have been provided with 2,500 km. of well-metalled roads. Road-making has also been started for the first time in the northeastern parts of the R.S.F.S.R.

Among the roads of All-Union importance are the Amur-Yakutsk main road, 869 km. long; the Chuiski highway, 598 km. long; the Usinski highway, 345 km. long; the Cheboksari-Kanash highway, 82 km. long; and a number of others, all of which have already been opened.

At the beginning of the first Five-Year Plan period the country had a total of 18,700 automobiles, practically all of them of foreign make. At the end of the Five-Year Plan period, as a result of the creation of an automobile industry in the country the number of motor cars reached 73,000, *i.e.*, four times as many as in 1928.

As a result of the adoption of new types of machines and heavy up-to-date trucks, the average tonnage of motor trucks was raised to 2.7 tons. At the beginning of 1933 motor cars of Soviet production constituted about 70 per cent of the total number of automobiles in the country.

During the last years of the Five-Year Plan period the construction of a number of auto-repair shops has been started, including the Moscow and Kiev auto-repair plants, a number of stations for preventive repairs, and a large number of garages, refuelling stations, etc.

The number of bus lines during the first Five-Year Plan period went up from 265 in 1928 to 582 in 1932 and their length increased from 14,582 km. in 1928 to 35,255 km. in 1932.

THE CIVIL AIR FLEET

The beginning of the construction of the civil air fleet in the U.S.S.R. dates back to 1923. On the eve of the first Five-Year Plan period the Soviet civil air lines had a length of 11,442 km. over which flights totalling 2.8 million km. had been made and 10,613 passengers, 93.2 tons of mail, and 162.2 tons of freight had been carried. In 1928 air surveys covered an area of 30,700 square km. and 33,600 hectares were covered from the air in the fight against animal and insect pests in forestry and agriculture. Aerial expeditions covered another 29,900 km.

As a result of the construction work carried on during the Five-Year Plan period the length of the air lines in regular use reached 30,517 km. in 1932, and 31,600 passengers, 454 tons of mail and 552 tons of freight were carried, this being equal to an increase of three times in the number of passengers carried, of five times in the amount of mail, and 3.5 times in the amount of freight as compared with 1928. The air lines include such trunk lines as the Moscow-Kharkov-Rostov-Mineralnye Vodi-Baku-Tiflis Line, the Moscow-Samara-Orenburg-Tashkent Line, the Moscow-Sverdlovsk-Novosibirsk Line, the Irkutsk-Khabarovsk-Vladivostok Line and the Moscow-Kazan-Magnitogorsk-Karaganda-Alma-ata Line, all of which were equipped in the main during the first Five-Year Plan period. The area covered by aerial photo surveys in 1932 was four times as large as in 1928.

The plan for aviation work in agriculture and forestry was exceeded many times over. In 1929 an area of 33,500 hectares was covered from the air in the fight against animal and insect pests in forestry and agriculture; in 1930 the area reached 68,000 hectares; in 1931, 246,000 hectares; and in 1932, 1,010,000 hectares. In addition to this, new forms of work were undertaken by agricultural and forestry aviation; 58,000 hectares were sown and 11.5 million hectares of forest land surveyed during 1932.

Much work has also been carried out in connection with various expeditions. During 1932 about 170,000 km. were covered by aerial expeditions (over 5.5 times as much as in 1928), and heroic work was done by aviators in the opening up of the arctic by the Soviet icebreakers (the Kara expeditions, the expeditions to North Land, Novaya Zemlya, Wrangel Island, Taimyr Peninsula, etc.).

During the Five-Year Plan period the civil air fleet made notable progress in the work of developing experimental aeroplane and motor construction (the all-metal giant plane ANT-14, the all-steel electrically welded aeroplane Stal-2, the construction of non-rigid airships for training purposes up to 7,800 cubic metres in volume). It has greatly strengthened the technical resources of the air lines and air bases and created the necessary conditions for an even more extensive development of aviation during the second Five-Year Plan period.

COMMUNICATION

The industrial development of the country, the creation of a number of new industrial regions, the improvement of the living standards of the working population, the advance of the cultural revolution and the elimination of illiteracy have dictated an enormous development of every form of communication service—post, telegraph, telephone and radio. The figures set down in the Five-Year Plan have been fulfilled in all of these fields and in some of the most important branches they have been overfulfilled in four and a half years. In 1932, communication of every sort reached a total of eleven billion conventional units as compared with 2,765 million in 1913 and 3,719 million in 1928. In tsarist Russia 60 per cent of the village settlements had no postal service; letters and newspapers were only delivered as opportunity offered. At the present time letters and newspapers in the rural postal districts are delivered four times in a five-day week, while in many of the bigger villages and in most of the Soviet farms and the machine and tractor stations there is a delivery every day. The number of post offices went up from 12,600 in 1928 to 44,500 in 1932.

The Five-Year Plan provided for 14,700 million letters and parcels to be handled during the five years, while in reality 20,700 million letters and parcels were handled during the four and a quarter years of the Five-Year Plan, which was thus exceeded by 40 per cent; according to the Plan, the number of telegrams dispatched was to be 127 million whereas actually 223 million telegrams were sent, *i.e.,* 76 per cent more than the number provided for. According to the Plan there were to be 92 million inter-urban telephone calls during the five years, whereas the actual number of calls was 110.7 million, an overfulfilment of 20.5 per cent.

In view of the considerable increase in the communication service given to industry and the increased provision for the needs of the population in this respect, the actual volume of capital investments in communication services has been far in excess of the planned estimates. The Five-Year Plan provided for an investment of 324 million rubles* in these services, while actual investments during the four and a quarter years amounted to 510 million rubles, or half as much again.

As a result of the collectivization of agriculture and the development of the regional centres and village soviets, the telephone service of collective farms, State farms, machine and tractor stations, village soviets and district centres has undergone considerable increase during the Five-Year Plan period. The percentage of village soviets having telephone communications has grown from 11.7 in 1929 to 37.2. The number of telephones installed in the villages went up from 19,300 to 40,100. As a result, the Five-Year Plan was exceeded in four and a quarter years by 78 per cent.

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* Including the radio receiving stations.

The telephone and telegraph service has been considerably extended during the first Five-Year Plan period. The total length of lines in the inter-urban telegraph and telephone services reached 1,480,000 km. in 1932 as compared with 504,000 km. in 1913 and 890,000 km. in 1928. According to the Plan the inter-urban telegraph and telephone services were to have received 185,000 km. of additional line, whereas actually 790,000 km. of line were added. The capacity of the telephone exchanges in the cities went up from 290,000 in 1927-28 to 482,000 in 1932. A completely new system of automatic telephone exchanges with a capacity of 77,000 numbers has been created.

Radio has been developed on a large scale. At the beginning of 1933 the U.S.S.R. held first place in the world in the power of its broadcasting stations. The number of radio-telegraph-telephone transmitting sets went up from 49 in 1928 to 73 in 1932 and their capacity from 328 kw. to 933 kw.; the number of receiving sets increased from 348,000 to 2.3 million.

Prior to the Revolution the communication services were completely dependent upon imported equipment. The powerful industrial development of the U.S.S.R. has made it possible to organize the home production of apparatus and equipment of all kinds, including radio, telephone, telegraph and signalling. The gross output of the electro-technical industry of low currents increased from 37.3 million rubles in 1927-28 to 272 million rubles in 1932. The Five-Year Plan of this industry was fulfilled in three and a quarter years. A large number of new manufactures have been developed during the Five-Year Plan period, including the production of automatic telephone exchanges of large and small capacity, powerful long and short wave radio stations, speedily operating telegraph apparatus, production of trunk line cables, high frequency telephone apparatus, infra and ultra tone telegraph apparatus, etc. Television and telegraphic transmission of images has also been organized, and extensive experiments have been conducted in the field of ultra-short wave lengths.

Industrial enterprises, State farms, and machine and tractor stations have been built in the most outlying parts of the vast territory of the Soviet Union. The development of a socialist communication service during the Five-Year Plan period has enabled the country to overcome tremendous distances by the use of modern apparatus. The communication services have become an important instrument in the development of the national economy and the cultural advance of the working population in both town and countryside.

LABOUR AND LIVING CONDITIONS

"THE rise in the technical equipment of labour, the labour enthusiasm of the masses of the people, the strengthening of enthusiastic and conscious socialist discipline, better organization of economic management, the determined struggle against bureaucracy, the widest possible development of self-criticism, the widest possible development of socialist competition among factories, plants, railway lines, shops, State farms, collective farms, villages and entire districts, in the fulfilment of the great tasks of socialist construction—all this put together should assure such an increase in the productivity of labour in the Land of the Soviets as is inaccessible to a capitalist society.

"The Congress approves the provision of the Plan concerning the numerical increase of labour engaged in industry and the considerable decrease of unemployment, with the simultaneous radical reconstruction and rationalization of industry, the placing of all industrial and transport workers upon the basis of the seven-hour work day, the considerable increase in the real wages and in the welfare of the masses of the toiling peasant population, the gradual elimination of the material and cultural difference between city and countryside. The Congress sees here a fundamental contrast born of principle, between socialist construction and the way of capitalist rationalization of production, which dooms great masses of working people to a state of chronic unemployment and hopeless want."

These provisions of the Fifth Congress of Soviets have been fulfilled, and in the principal features overfulfilled, in four and a quarter years.

The growth of the proletariat, the consolidation of its forces, the strengthening of the socialist attitude towards labour, the growth of socialist competition and shock work, the technical re-equipment of labour on the basis of mechanization of the processes of labour, the rise of the material and cultural living standards of the toiling masses, the complete elimination of unemployment the overcoming of poverty and pauperism in the countryside, the socialization of an overwhelming part of labour in agriculture, the seven-hour work day—these are the main results of the first Five-Year Plan in the realm of labour.

During the first Five-Year Plan period the U.S.S.R. has succeeded in radically changing the historically formed social division of labour, in eliminating the bases and the sources of exploitation of man by man, in almost completely socializing labour and in drawing new millions of proletarians into State and co-operative enterprises.

These victories have been gained as a result of the complete elimination of the non-productive waste of social labour, insurmountable in capitalist society, and of the severe class struggle against the capitalist elements desperately resisting the introduction of socialist forms of labour organization and the strengthening of labour discipline.

The number of workers in the U.S.S.R. has almost doubled in the course of the first Five-Year Plan period. Instead of 11.59 million workers and employees engaged in all branches of national economy in 1928, their number reached 22.8 million in 1932, an increase of 96.6 per cent. This growth in the number of workers and employees exceeded the provisions of the Five-Year Plan for the year 1932-33 by 44.7 per cent.

The number of workers and employees engaged in the enterprises of the socialized sector has increased by 12.5 million, amounting to 225 per cent of the number of workers in the socialized sector in 1928.*

The number of the entire proletariat at the beginning of 1933 is double the pre-war level of 1913,** and the number of workers and employees engaged in the census industry exceeds the pre-war level 2.3 times.

These figures stand out in contrast to the ever growing unemployment in the capitalist world in connection with the deepening of the crisis, which has brought the army of unemployed to the unprecedented size of over 30 million persons,* according to the data of the Labour Office of the League of Nations. The index of employment in the United States (1928 = 100) in 1932 according to the data of the Federal Reserve Board fell to 64.2; in Germany, employment of workers engaged in industry fell to 41.6 per cent of the level of 1928, according to the figures of the *Institut für Konjunkturforschung,* Berlin.

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* The larger increase in the number of workers and employees engaged in State and co-operative enterprises and institutions, as compared with the general increase in the number of workers, is due to the simultaneous decrease of the number of workers and employees in the private sector.

** The pre-war proletariat included 3 million farm-hands engaged on landlords' and *kulaks'* estates, and over 1.5 million personal servants.

The enormous quantitative growth of the proletariat in the U.S.S.R. has been accompanied by substantial qualitative changes in its composition. The nature of these changes reflect directly the socialist reconstruction that has been taking place in the country.

The most outstanding and decisive of these changes is the transformation of the basic mass of the workers into shock workers, into people who have acquired a new attitude toward labour, regarding it as a matter of honour.

By his example, the shock worker kindles the enthusiasm of the backward workers, educates them and overcomes the non-proletarian, petty-bourgeois traditions brought into the proletarian environment from the outside. By his participation in the drawing up of the plan of production, and in his struggle for the fulfilment of the plan, for cost accounting, for rationalization, for mastering the technique of production, the shock worker fulfills new functions of the proletarian as the organizer of the social process of production and the executor of his socialist plan.

In this connection socialist competition and shock work in which three-quarters of all the workers participated in 1932 assume particular significance. Cost accounting brigades embraced about one-third of all the workers.

The increasing part played by workers in making inventions, the considerable rise in the number of workers engaged in various kinds of technical study, the growing participation of workers in improving the Soviet Government apparatus—all this marks the beginning of the process of the mastering by the masses of workers of those functions which under capitalism are the privilege of brain workers.

An important role in organizing shock brigades and in helping the proletariat to re-educate itself belongs to the trade unions which are the basic school of communism for the masses of workers. The Soviet trade unions, under the leadership of the Leninist Communist Party, had a membership of 17.9 millions in 1932. Thus, 74 per cent of the entire proletariat of the Soviet Union were members of trade unions. No other country in the world knows of a similar proportion of trade union membership.

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* The figures of actual unemployment are considerably higher, since the stated number of unemployed does not include the considerable army of partly unemployed.

The high degree of organization of the new cadres of proletarians in the Soviet trade unions deserves particular attention. We refer here to those loose amorphous masses of workers who were not engaged in industrial work before and have not had the schooling of socialist large-scale production (building workers, agricultural workers, etc.).

In Germany, where the degree of organization of the workers is higher than in other capitalist countries, less than 30 per cent of all the workers are organized in trade unions. In 1929 the reformist trade unions of Germany* had a membership of 4,948,200 and in 1931 their membership was 4,134,900. The Christian trade unions** had 673,000 members in 1929 and 658,000 in 1931.

If we add to the figures of these two main centres of the German trade union movement the number of workers in the Hirsch-Dunker and various other trade unions, the total number of workers organized in trade unions in 1931 will not exceed 5.8 million. According to the latest census this amounts to no more than 27 per cent of the total number of workers and employees.

In Great Britain*** the total number of workers organized in trade unions was 4.611 million at the end of 1931, which also amounts to about 28 per cent (the total number of workers and employees is estimated at approximately 16 to 17 million). The degree of organization of workers in the United States and in France is two to three times lower than in Germany.

According to the figures of the American Federation of

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* According to *Jahrbuch des Allgemeinen Deutschen Gewerkschaftsbundes*, 1931, p. 301.

** According to *Jahrbuch der Christlichen Gewerkschaften*, 1931, Berlin-Wilmersdorf.

*** According to the *Ministry of Labour Gazette*, October 1932, p. 366.

Labour,* the number of workers organized in the unions affiliated with the A. F. of L. equalled 2.889 million in 1931. Together with other unions, both centralized and non-centralized, the number of organized workers in the United States reaches 3.5 million to 3.6 million which amounts to about 10 per cent of the total of 35 million wage earners.

When we turn to the lower paid and unskilled workers, we find that the percentage of workers organized in unions is still lower.

In the course of the first Five-Year Plan period, private exploitation of wage labour in the U.S.S.R. was almost entirely eliminated. In 1928 about 14 per cent of the proletariat (1.6 million) were engaged in the private sector of national economy. The Five-Year Plan estimated that the number of workers in the private sector would increase by about 9 per cent, while at the same time their percentage to the total number of workers would decline. Actually, the percentage of workers privately employed fell to 4.4 per cent in 1930, and to 1.6 per cent in 1931. At present, private exploitation of labour is almost entirely eliminated.

The elimination of capitalist wage labour is reflected particularly in the changed structure of the agricultural proletariat. The number of agricultural workers employed in the State farms amounted to 345,400 in 1928. At the beginning of the Five-Year Plan period the bulk of agricultural workers, 1.3 million, consisted of farm labourers. In 1932 the workers employed in the State farms and the machine and tractor stations constituted an army of 2.3 million, a considerable portion of whom were industrial workers (tractor operators, auto drivers, repair workers, combine operators, etc.).

The picture of the distribution of the labour power in various branches of economy in its turn reflects the process of socialist industrialization. With a general increase of 96.6 per cent in the number of workers and employees, the largest increase took place in the productive branches of labour (building, census industry, State farms and machine and tractor stations).

The distribution of the growth of the proletariat during the Five-Year Plan period (1928-32) according to branches of work may be seen from the following table:

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* *The American Labour Year Book*, 1932, by the Labour Research Association.

	1928	Increase	1932	1932 in percentage relation to 1928	Growth in percentage of total
	(In thousands)				
In all branches of national economy	11,599.0	22,804.3	11,205.3	*196.6*	*100.0*
In census industry	3,126.0	6,411.1	3,185.1	*201.9*	*28.4*
In building industry	723.0	3,125.8	2,402.8	*432.3*	*21.4*
In agriculture and forestry	2,007.0	3,905.1	1,898.1	*194.6*	*17.4*

In contrast to capitalist countries where, even before the crisis, there was a clearly noticeable tendency in the direction of a decrease of the percentage of industrial workers and an increase of the percentage of workers engaged in various kinds of service, in the U.S.S.R. the opposite process took place during the Five-Year Plan period: an uninterrupted growth of the number of workers and employees engaged directly in the sphere of material production.

The percentage of industrial workers engaged in industry, building, transport and communication increased from 48.5 per cent to 53.9 per cent. The percentage of workers engaged in State farms and machine and tractor stations increased from 3 per cent to 10 per cent during these years.

Within the boundaries of industry itself, about half the increase in the number of workers falls to the leading branches of industry. Within the different branches of industry new categories of skilled workers engaged in mechanized production make their appearance. Thus, in the coal industry there is an increase in the percentage of workers engaged in mechanized coal-digging.

Socialist industrialization of formerly backward borderlands and regions of national minorities has resulted in the creation of new industrial regions, new centres of economic and cultural development. This has materially affected the geographic distribution of the proletariat and the curve of the number of workers in various regions.

Thus, from 1929 to 1931, with a general increase of 54.1 per cent in the number of workers in the U.S.S.R., new industrial regions, and regions inhabited by national minorities, show a much larger rate of growth:

Number of workers in principal regions in 1929-31

	1929 (In thousands)	1931	1931 in percentage of 1929
Entire proletariat of U.S.S.R.	12,167.9	18,750.5	*154.1*
Old industrial regions (Moscow, Leningrad, Gorky Territory, Ivanovo Region)	4,104.8	5,897.5	*143.7*
Ural-Kuzbas (Urals, Bashkiria, Kazakstan, Western Siberia)	1,452.8	2,639.5	*181.7*
Central Asia (Turkmenistan, Tadjikistan, Uzbekistan)	286.8	534.3	*186.3*
Eastern regions (Far-Eastern, Eastern Siberia and Yakutia)	360.7	593.1	*164.4*

The U.S.S.R. has entirely eliminated unemployment, this most cruel scourge of the working class. In 1927-28 there were 1.3 million unemployed in the U.S.S.R. In 1929 the Labour Exchange had registered up to 1.6 million unemployed. The Five-Year Plan proposed to decrease the number of unemployed to 511,000.

The growth in the number of workers and employees not only absorbed the workers that were unemployed at the beginning of the Five-Year Plan period, but required the drawing in of additional masses of labour resources.

In 1928-32 a total of 12.5 million workers and employees were drawn into various branches of labour (this figure includes 1.3 million workers who took the place of dead or incapacitated workers and workers away on courses of study). According to preliminary estimates this increase was derived from the following sources: about 4 million persons from the urban population (of them—1.7 million youths of the new urban generation, about 0.5 million persons graduated from colleges, universities and technical schools, about 1.4 million women, previously not engaged in production, about 0.4 million artisans, and others), the remaining 8.5 million came from the peasantry—poor, middle peasants and collective farmers.

But this influx of new proletarians from among the rural population is radically different from the influx that used to take place as a result of poverty and pauperization in the countryside and as a result of agrarian overpopulation. Based on the socialist reconstruction of agriculture and the elimination of poverty and pauperism in the countryside, a new form of organized recruiting of labour power has made its appearance: the recruiting of workers through agreements between industrial enterprises and collective farms.

During the Five-Year Plan period, the number of women engaged in various branches of national economy more than doubled. The increase in the number of women workers during that period amounted to more than 3.5 million. In January 1932 the percentage of women workers engaged in all branches of non-agricultural work amounted to 31.5 per cent (as against 28.3 per cent in January of 1929). In industry their percentage amounted respectively to 32.3 per cent and 26.1 per cent and in building—to 12.5 per cent and 6.6 per cent.

It should be emphasized that in the U.S.S.R., in contrast to capitalist countries, women were drawn into skilled work on a large scale. Thus, by the census of 1926 and the registration of the urban population of 1931, the number of skilled women workers was: metal workers—4,800 in 1926 and 68,700 in 1931; wood working—respectively 800 and 6,000; printing—5,200 and 12,900; building—700 and 17,000; machinists at power installations—600 and 12,500.

Engaged in productive work and raising her skill, the woman worker of the Soviet Union is freeing herself from the drudgery of house work, which is of an isolated nature and low productivity, and is really becoming a full-fledged participant in socialist production.

The development of a network of nurseries, pre-school institutions, communal kitchens and dining rooms; the attendance by a large percentage of women at various schools and training institutions (the percentage of girls in the factory schools rose from 27.6 per cent in 1928 to 32 per cent in 1932; in the industrial technical schools—from 9 per cent to 27.8 per cent and in the industrial colleges—from 13 per cent to 18 per cent), all this has been a determining factor in the emancipation of the woman, in enabling her to engage in productive work.

A feature of the changes that have taken place in the structure of the labour power in industry is the considerable growth of the number and quality of skilled workers, the higher level of technical education of a considerable portion of the workers and the increase in the number and percentage of specialists, particularly young specialists, who rose from the ranks of workers.

The growth of the technical qualifications of the industrial workers is indicated by the increase of 2 million in the number of workers engaged in highly-skilled and skilled occupations. The improvement of the technical skill and qualifications of the workers was achieved with the aid of special courses of study and training in the factory schools which graduated 300,000 persons during the Five-Year Plan period. In large plants from one-third to one-half of all the workers are engaged in technical study.

The numerical increase and the strengthening of the structure of the proletariat have brought about considerable changes in the composition of the population of the country.

While the population increased from 154.2 million in January of 1929 to 165.7 million in January of 1933, the percentage of the proletarian population increased from 19.9 per cent in 1928 to 31.1 per cent in 1932.

The percentage of the proletariat in the total urban population (according to census figures) amounted to 68.5 per cent in December of 1926; by the figures of urban registration, it was 85.4 per cent in April of 1931, and according to the preliminary estimates of the State Planning Commission of the U.S.S.R. it amounted to 88 per cent in January of 1933.

Along with the growth of the proletariat, there is also a noticeable increase in the percentage of persons among the urban population in industrial co-operative associations (handicraft co-operatives). According to the census of 1926 this type of producer amounted to 0.5 million or 2.1 per cent of the total urban population of the country. By the urban registration of 1931, their number increased to about 2 million, constituting about 6.2 per cent of the total urban population. Simultaneously there is a sharp decline in the percentage of non-working elements (bourgeoisie, clergy, declassed elements) in the urban population. In 1926 they amounted to 5.1 per cent and in 1931 only to 1 per cent of the urban population.

During the four years of the Five-Year Plan period, a number of new towns has grown up and the population in the old towns and cities increased. In all, the urban population grew from 27.6 million at the end of 1928 to 38.7 million at the end of 1932, an increase of 40.2 per cent. The number of the rural population has remained almost stable, with 126.6 million in 1928 and 127 million in 1932. The percentage of the urban population in the general population of the country increased from 17.9 per cent at the end of 1928 to 23.3 per cent at the end of 1932.

The general growth of the urban population was accompanied by an increase in the population of the large cities. Thus, according to the census of 1926, there were 31 cities in the U.S.S.R. with a population of 100,000 or over. In 1931 there were 46 such cities, and the percentage of the population of these cities in the total urban population increased from 36.2 per cent to 46.2 per cent.

The augmentation of the ranks of the proletariat by many millions of peasants, who obtained an opportunity to change from rural labour of low productivity to technically equipped industrial labour, has brought with it a general rise in the productivity of social labour as a whole. At the same time this increase in the number of industrial workers has brought with it the necessity of great exertion in order to train and assimilate these new millions of workers.

During the four and a quarter years of the Five-Year Plan period, the output per worker (in the fixed prices of 1926-27) increased by 41 per cent (compared with the output in 1927-28, the year preceding the Five-Year Plan period). In the heavy industry the output per worker increased 53.1 per cent. Compared with the pre-war period, the productivity of labour in large-scale industry has almost doubled.

These figures of the average growth of the productivity of labour do not, however, disclose the wide difference in the rate of growth of labour productivity in different branches of industry, as shown in the following table of the increase in output per worker in 1932, as compared with 1927-28.

Branches of industry producing means of production (Group "A")

Group "A" as a whole	153.1
Fuel	144.3
Including:	
Coal	124.0
Oil (extraction)	171.4
Ferrous metallurgy	135.2
Non-ferrous metallurgy	122.5
Machine building	169.3
Glass	203.5
Heavy chemicals	136.9

Branches of industry producing articles of consumption

(Group "B")

Group "B" as a whole	140.8
Cotton textile	123.0
Silk	134.2
Hemp and jute	163.0
Knit goods	153.0
Leather and shoes	127.4
Printing	169.4
Food	149.5
Tobacco	184.2
Confectionery	291.3

The above indices of average output per worker do not reflect the qualitative angle of the growth of the productivity of labour, which finds its expression in the mastery of a number of new, technically complicated branches of production (powerful locomotives, automobiles, tractors, complicated agricultural machines, electrical equipment, etc.) and of new methods of production.

It must also be taken into consideration that the growth of productivity of labour is taking place simultaneously with the reduction of the work day from eight to seven hours, under conditions of a huge influx of new, untrained masses of workers, the organization of new branches of production and an increased proportion of complicated highly labour absorbing manufactures.

When we take into account the reduction in the length of the work day, we get a per hour increase in the output per worker amounting to 61.1 per cent for the Five-Year Plan period, or 2.8 times the output per hour per worker of 1913.

In railroad transportation the productivity of labour (measured in the number of kilometre-tons per worker) increased by 61 per cent.

Figures relating to State farms show an increase of output per worker for a period of three years (from 1928-31) amounting to 59.8 per cent. The productivity of labour in the various sectors of agriculture (socialist farms and individual holdings) is reflected in the following table:

*Direct expenditure of labour per hectare of grain cultivation in 1931**

	Labour per hectare in days			Percentage relation to individual peasant holdings	
	State farms	Collective farms	Peasant holdings	State farms	Collective farms
	Winter grain				
Ukrainian S.S.R	1.1	10.0	13.0	*8.5*	77.7
Northern Caucasus	1.2	8.6	17.9	*6.7*	*48.0*
Lower Volga	2.8	8.6	16.3	*17.2*	*52.8*
	Early spring grain				
Ukrainian S.S.R.	1.5	9.2	14.9	*10.1*	*61.7*
Northern Caucasus	1.5	6.1	12.7	*11.8*	*48.0*
Lower Volga	2.0	6.3	11.8	*16.9*	*53.4*

The table shows that in the State farms the expenditure of labour per hectare is from six to ten times less than in individual peasant holdings, and in the collective farms it is from 1.3 to 2 times less than in peasant holdings.

The rate of growth of the productivity of labour in the U.S.S.R., when compared with the corresponding rate in the most advanced capitalist countries, shows the unquestionable superiority of the socialist system of economy. In the manufacturing industries of the United States the productivity of labour increased by 46.8 per cent during the period of 1920-30. In Germany the productivity of labour for the period of 1913-31, according to Kuczinsky's data, increased by 27 per cent. In England the productivity of labour rose during the period of 1924-31 by 10.6 per cent.*****

These figures show that the rate of growth in the productivity of labour in the Soviet Union in the course of the first Five-Year Plan period are quite unattainable in any capitalist country.

On the basis of the growth of the productivity of labour and its socialization, the material and cultural standard of living of the masses has risen greatly.

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* These figures are based on data obtained from 123 State farms of the Grain Trust, 144 collective farms investigated by the Central Board of National Cost Accounting in 1931 and from the peasant households according to peasant budgets of 1924-25.

** According to figures of the National Bureau of Economic Research.

*** According to figures quoted by Clarke in *National Income*, 1932.

In the course of 1928-32, a steady rise in wages took place, as may be seen from the following table:

Annual wages per worker
(In Rubles)

	1928	1932	1932 in percentage relation to 1928
All workers	703.4	1,432.4	*203.6*
Census industry	870.0	1,478.4	*169.7*
Building	996.0	1,544.9	*155.1*
Agriculture and forestry	305.9	957.9	*313.2*
Education	678.0	1,630.0	*240.5*

The average wage has almost doubled in the course of the Five-Year Plan period, exceeding the estimates of the Five-Year Plan (for the year 1932-33) by 44 per cent.

The wage curve in census industry may be seen from the following table:

Movement of monthly wages of workers in census industry during the Five-Year Plan period

	1928	1932	1932 in percentage relation to 1928
	Absolute figures (In Rubles)		
All industry	70.24	116.62	*166.0*
Coal industry	63.27	122.08	*193.0*
Iron and steel	75.61	132.24	*174.9*
Engineering machine building (including electric equipment)	92.94	142.93	*153.8*
Chemical	82.09	122.62	*149.4*
Cotton	59.89	85.89	*143.4*
Woollen	63.73	90.16	*141.5*
Linen	41.58	70.60	*169.8*
Leather and shoe	86.72	112.11	*129.3*
Food (except sugar)	73.37	101.83	*138.8*

The rate of the increase of wages in different branches of industry was determined by the policy of favouring the most important branches and occupations, which accounts for the largest percentage of increase for the coal industry and ferrous metal industry (93.0 per cent and 74.9 per cent respectively).

The greatest rate of increase in wages is shown in agriculture (from 305.9 rubles in 1928 to 957.9 rubles in 1932). The figures for 1928 show the very low wage level of the farm labourers employed by the *kulaks,* while the figures for 1932 apply mainly to the wages of agricultural workers in the State farms and machine and tractor stations.

The wages of educational workers rose 2.4 times, the wage level of these workers having been below the general wage level at the beginning of the Five-Year Plan period.

The rise of the wage level together with the increase in the number of workers determined the increase in the wage fund.

Payrolls in millions of rubles

	1928	1932	1932 in percentage relation to 1928
All branches of national economy	8,158.8	32,667.3	*400.4*
Census industry	2,720	9,330.0	*343.0*
Building	720	4,829.2	*670.7*
Agriculture and forestry	614	3,740.6	*609.2*
State farms and machine and tractor stations	113	2,059.0	*1,823.0*

Thus, the payrolls of workers and employees in the entire national economy increased four times in the course of the four years of the Five-Year Plan period.

In addition to wages paid directly to the workers, increasing funds have been expended for the purpose of raising the welfare of the working class along the line of cultural service and improved living conditions, connected with their productive employment.

This includes State expenditures for education, cultural service, health protection, services in connection with improving the living conditions of the workers (the maintenance of which is paid for from a special fund derived from contributions by the respective enterprises), benefits in connection with temporary incapacity for work, pensions, etc.

The following table gives an approximate picture of the main features and the extent of these expenditures as applying to non-agricultural workers (not counting employees):

Principal items of expenditures for cultural service and for the improvement of living conditions of non-agricultural workers in 1928 and in 1932

Item of Expenditures	Amount in million rubles 1928	1932	1932 in percentage relation to 1928
1. Social insurance benefits:*			
a) Sickness benefits	200.9	548.3	*272.9*
b) Unemployment benefits	65.4	—	—
c) Pensions	128.8	300.7	*233.4*
d) Other social insurance benefits	—	33.1	—
e) Total pensions and social insurance benefits	395.1	882.1	*223.3*
2. Contributions by trade unions	17.4	26.0	*149.4*
3. Stipends	34.5	508.2	*1,473.0*
4. Education and cultural service	216.7	1,885.1	*869.9*
5. Health protection	234.8	1,033.0	*440.0*
6. Fund for improvement of living conditions of workers	40.8	60.8	*149.0*
7. Additional pay to pupils of factory vocational schools for hours of theoretical study	8.1	84.1	*1,038.3*
Total for above items	947.4	4,479.3	*472.8*
Total except unemployment benefits	882.0	4,479.3	*507.8*

These results of the Five-Year Plan stand out in sharp contrast to the continuous lowering of the share of the proletariat in the national income in capitalist countries. According to the computations of Professor P. Douglas, published in *The World Tomorrow*, the curve of payrolls and of dividends in the U.S.A. appears as follows:

	Index of payrolls	Index of income of capitalists (dividends and interest)
1926	100	100
1932	38	160

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* The Soviet social insurance system is based entirely on contributions from the State and from the various economic organizations. No contributions whatever are paid by the insured workers and employees.

The table shows that the index of income of capitalists rose by 60 per cent, while the index of paid wages, on the contrary, fell by 62 per cent.

It is in the nature of capitalism to exploit labour power in a wanton manner, through the increased intensification of labour; the socialist reconstruction in the U.S.S.R., on the contrary, is accompanied by constant concern for the main productive force of society, the worker, and for the establishment of new wholesome conditions of work.

The first Five-Year Plan shows a number of characteristic steps in this direction, such as the shortening of the work day and of the work week, the lengthening of rest and vacation periods. The work day has been shortened from 9.9 hours in 1913 to 7.8 hours in 1928 and to 7 hours in June 1932, the latter figure including overtime work.

In hazardous and underground work and for young workers from sixteen to eighteen years of age, a six-hour work day has been established, and for some groups of workers the work day has been shortened to five or even four hours.

The change to the five-day and six-day work week accomplished in the course of the first Five-Year Plan period resulted in an increase in the number of rest days. To this must be added the increase in the number of vacation days* (in 1932 they amounted to 15.1 work days).

As a result of the shortening of the work day during the first Five-Year Plan period there is an increase in the leisure time of the workers, which assures a further rise of their cultural level and technical knowledge, the growth of their participation in public affairs and a chance of utilizing more of their leisure for wholesome cultural recreation.

The improvement of the living standards of the Soviet proletariat during the Five-Year Plan period was influenced to a large degree by the fact that members of the workers' families have been drawn into productive work on a large scale. The number of wage earners in a family of an industrial worker in the U.S.S.R. increased from 1.2 at the end of 1928 to 1.5 at the end of 1932.

With the increase in the wages of the industrial worker—the head of the family—amounting to 94 per cent during the four-year period (end of 1928 to end of 1932), the average wage per member of a worker's family rose by 130 per cent.

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* It is only in the U.S.S.R. that *every* worker and employee is entitled to an annual holiday *with pay;* only work days are counted; the usual rest days are added, thus lengthening the holiday

Along with the considerable rise of the material welfare of the working class as a whole, there has been a particularly great and rapid rise in the welfare of certain sections of the population whose living standards used to be below the general level: peasants and collective farmers drawn into industry have raised their living standards from 2.5 to 3 times; families of poor peasants who joined collective farms have increased their income to the level of middle peasants before the latter joined the collective farms.

The radical technical reconstruction of the national economy of the U.S.S.R. during the Five-Year Plan period has been accompanied by considerable achievements in the matter of labour protection which in turn contributed to the rise in the productivity of labour.

Appropriations for special measures in the direction of improving the sanitary and safety conditions of labour in industry and transportation increased steadily from year to year, as may be seen from the following table:

(Excluding the enormous investments for safety devices in newly built plants)

Year	Amount
1928-29	64.9
1929-30	95.2
1931	123.3
1932	169.5

Thus, in the course of the four years of the Five-Year Plan period the appropriations for labour protection amounted to 453.4 million rubles, as against 332.7 million rubles provided for in the Five-Year Plan for a period of five years. Here the Plan was overfulfilled by 36 per cent.

The mechanization and reconstruction of the technological processes at the new works effected a radical change in the conditions of work and rendered them more healthy and safe.

According to statistics of the metallurgical plants in the Ukrainian S.S.R., the annual number of accidents per blast furnace with hand loading was: fatal accidents—1.1; other accidents with loss of capacity for work—11.4; occupational poisoning—135. In the newly reconstructed plants the number of accidents per blast furnace of mechanized loading was: fatal accidents—0.1 (11 times less); other accidents—1.9 (6 times less); occupational poisoning—4.0 (34 times less).

The effects of mechanization of labour upon the decrease in the number of accidents in the mining industry may be seen clearly from the fact that the number of accidents at work per machinist in underground work is three times lower, and per cutting machine operator—one and a half times lower, than per worker working without machines.

In the new coke-benzole plants in the Ukraine in 1931 accidents at work were 44 per cent lower than in the old plants.

As a result of the policy of the Soviet Government with respect to technical improvement and as a result of the special attention paid to labour protection, industrial accidents in the U.S.S.R. declined sharply in the course of the Five-Year Plan period.

In the coal industry the decline in accidents amounted in 1932 to 43.6 per cent compared with 1929, in the metallurgical industry—37.5 per cent, in the heavy chemical industry—28.9 per cent and in the oil industry—32.9 per cent.

The greatest decline in accidents is shown in those branches of industry where the greatest degree of technical reconstruction has been carried out and where the basic processes of production have been radically reorganized.

At a time when mechanization, which is an inseparable part of socialist rationalization, led to such a sharp decline in industrial accidents in the Soviet Union, capitalist rationalization with merciless consistency brings a steady increase in industrial accidents even under conditions of maximum mechanization. Thus, in one of the best mechanized mines in Germany (Achenbach) the number of accidents per thousand workers in 1928 was 211.3, in 1929—266.4 and in 1930—289.1. The number of fatal accidents in the U.S.S.R. is considerably lower than in the capitalist countries. Thus, in 1929 (the last year for which comparative data are available) the number of fatal accidents per thousand workers in the mining industry was: in the Ukrainian S.S.R.—1.7, in Prussia—1.9, in Japan—3.4, in the United States—4.5.

The improvement of the sanitary conditions of labour has brought about a decline in the number of cases of sickness. This shows itself first of all in the curve of occupational diseases. There has been a sharp decline in occupational poisoning in the basic industries (in the chemical industry—from 10.9 to 2.9, in the metal-working industry—from 1.8 to 0.8, etc.). The considerable decrease in the number of cases of occupational poisoning (in the occupations exposed to the strongest industrial poisons) is explained by the fact that the Soviet Government has paid particular attention to the problem of eliminating poisons in production. Thus, the production and use of white lead have been almost entirely discontinued in the U.S.S.R., while in the reformist trade unions and in the Labour Office of the League of Nations fruitless talk about the elimination of this industrial poision has been going on for years.

The result of the radical improvement in the sanitary conditions of labour shows itself even more strikingly in the statistics of general sickness. The first Five-Year Plan period brought about a decline in the number of cases of sickness amounting to 16 per cent and in the number of days lost through sickness—a decline of 22 per cent.

The great decline in the number of cases of sickness and accidents in the U.S.S.R. stands out in relief when compared with corresponding figures in capitalist countries, where in recent years there has been an increase in the percentage of sicknesses and accidents; in the statistics of the last years of the crisis this increase is minimized because the changes in the insurance laws and the fear of loss of employment force the workers to remain at work when their sickness is not of a grave nature.*

But in spite of this minimization, the increase in the number of accidents is so great that even bourgeois statistics must take note of it. Thus, in Germany, for instance, the number of accidents per thousand insured workers in 1929 was 85.05 as against 45.1 in 1920 and 75.6 in 1926.

Even more striking are the figures on fatal accidents.

Number of fatal accidents per 1000 workers

Year	United States		France	Prussia
	Bituminous coal mines	Anthracite mines		
1927	4.6	3.94	0.98	2.28
1930	5.26	4.22	1.15 **	3.09

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* This is admitted even in bourgeois statistics. In the official returns of the German statistics of social insurance for 1932 we read: "The lowering of the coefficient of illness in the years of the crisis does not reflect the actual state of health of the insured; rather, the low coefficient serves as an index of the desire, brought about by the crisis, not to fall ill. Besides, the low coefficient of illness is a result of the decrees of 1930-31."

** In 1929.

The years of the general crisis of the capitalist system have brought with them in almost every capitalist country a sharp worsening of social insurance, a decrease in the rates of insurance benefits and pensions, not to mention the fact that in the United States and in a number of other countries there is no State insurance for workers at all.

In contrast to this, the total expenditure on social insurance in the U.S.S.R. increased from 1,050 million rubles in 1928 to 4,120 million rubles in 1932, an increase of 400 per cent. On this point the original provision of the Five-Year Plan has been overfulfilled two-fold.

In the first year of the Five-Year Plan period, the expenditures for unemployment aid amounted to 136.4 million rubles or about 11 per cent of the entire social insurance budget. The elimination of unemployment in the U.S.S.R. made it possible to strike out entirely this item from the social insurance budget and to divert a considerable portion of the former unemployment fund for other measures of hygiene and of improving the living conditions of the workers.

In 1928 the expenditures for this type of improvements amounted only to 139 million rubles, or 13.2 per cent of the total social insurance fund. In 1932 the expenditure for hygienic measures and for the improvement of living conditions amounted to 1,888.1 million rubles, *i.e.*, 13.5 times as much as in 1928. This sum amounted to 45.6 per cent of the entire social insurance budget.

Expenditures for health protection in the U.S.S.R. from all sources (including capital investments) amounted in 1928 to 622 million rubles and in 1932—to 2,077.5 million rubles. The expenditures for health protection in 1932 amount to 334 per cent of the sum expended in 1928.

This resulted in the great improvement of the medical service for the entire population and particularly for the workers. Thus, on January 1, 1929, the number of hospital beds in the U.S.S.R. amounted to 246,100 and on January 1, 1933 the number grew to 405,800. In the cities the number of hospital beds increased by 58 per cent and in the rural districts—by 90 per cent.

It is necessary to note the considerable development of the network of medical stations directly serving the workers of large plants and factories. In 1928 there were 1,580 such stations and in 1932 their number increased to 5,674.

There was a great increase in the number of nurseries. In 1928, there were 43,600 places in nurseries in towns and in 1932 the number was 286,400 (6.5 times as many). In the agricultural districts the figures are respectively 4,700 and 435,500 (92 times as many.

The sanatorium and health-resort service for workers increased 100 per cent in the course of the Five-Year Plan period. Five hundred and eleven thousand persons availed themselves of the rest homes and sanatoriums at the expense of the social insurance fund in 1928, while in 1932 the number exceeded one million persons.

In the course of the four years of the Five-Year Plan period, the housing accommodation in the cities and towns has grown considerably. Capital investments in housing in the socialized sector amounted to:

1928	318.0	million	rubles
1929	419.4	,,	,,
1930	785.7	,,	,,
1931	1,018.0	,,	,,
1932	1,817.0	,,	,,

In the course of the Five-Year Plan period, the total capital investments of the socialized sector in housing amounted to more than 4 billion rubles. In addition, 400 million rubles were spent on capital renovations of dwellings.

As a result of these great expenditures for house building there has been a notable increase in housing accommodation, as may be seen from the following table:

Total housing accommodation in the cities during the period of 1928-32 (the end of the year)

1928	162.46	million	square	metres
1929	166.96	,,	,,	,,
1930	172.61	,,	,,	,,
1931	177.75	,,	,,	,,
1932	185.06	,,	,,	,,

In the course of the first Five-Year Plan period, a new floor space of 22.264 million square metres was made available to the workers in the socialized sector. In addition, about 5 million square metres of dwellings constructed in the last years of the Five-Year Plan period will be ready for occupation in 1933. Thus, the total of house building in the socialized sector in the course of four years amounted to 27.264 million square metres. The share of heavy industry in the total investments in house building amounted to 27.5 per cent in 1929 and rose to 38 per cent in 1932. The dwelling area in the coal industry increased 2.5 times and in the iron and steel industry—nearly four times.

In the old and new industrial regions, house building has been developed on a tremendous scale. During the last years the dwelling area in the Donbas region has been doubled and in the Ural region it increased 2.5 times.

In Moscow, over 2 million square metres of floor space were built during the period of 1929-32, in Leningrad—1.5 million sq. meters, in Kharkov—503,000 sq. meters, in Gorky—456,000 sq. metres.

The housing conditions of the workers, particularly in the Donbas region, have greatly improved. The workers who had formerly lived in clay huts have been moved to new houses. Before the Revolution in the Ukraine alone about 40 per cent of the workers lived in such huts.

Undoubted successes have been scored by the republics of national minorities in the matter of improving housing conditions. In the course of four years, investments in house building in Uzbekistan amounted to 48.8 million rubles, in the Tadjik Republic—16.5 million rubles, in the Turkoman Republic—17.8 million rubles. During these years dozens of new towns and centres grew up in the republics of non-Russian nationalities.

At the beginning of the Five-Year Plan period, the fixed capital of municipal enterprises and installations was estimated at 2 billion rubles. Toward the end of the Five-Year Plan period the fixed capital of municipal enterprises and installations increased more than 1.5 times, reaching 3.2 billion rubles.

Along with housing construction, there has been a radical reconstruction of municipal services. New towns have been built, considerable improvements have been effected in the workers districts, particularly in those located on the outskirts of large cities.

New roads and railway lines for local transit have been built, the towns have been planted with trees, sewage and water-supply systems have been constructed in a number of cities, trolley and autobus service has been introduced.*

In the course of the Five-Year Plan period 1,848 million rubles were expended on municipal improvements, three times as much as in the preceding five years.

The achievements of the U.S.S.R. during the first Five-Year Plan period in the realm of housing construction and municipal improvements appear particularly striking against the background of the terrible housing conditions of the workers in capitalist countries and in contrast to the collapse of municipal construction which was brought about by the financial breakdown of the municipalities in capitalist countries.

As a result of the great achievements of socialist construction in the course of the Five-Year Plan period, which brought about a radical change in the conditions of labour and an improvement of the material well-being of the working class of the U.S.S.R., there has been a considerable growth in the rate of increase of the population.

The population of the U.S.S.R., which in 1926 numbered 147 million persons and, in 1928, 154.2 million persons, grew toward the end of 1932, according to preliminary estimates, to 165.7 million persons, an increase of 18.7 million or 12.7 per cent.

The total increase in the population of the U.S.S.R. exceeds the combined population of Austria, Belgium, and Switzerland.

There has been a considerable decline in the mortality of the population of the U.S.S.R. In 1931 the mortality fell 31.5 per cent as compared with the year 1913, and in the principal proletarian centres the drop was still greater: 40.8 per cent in Moscow, 41.8 per cent in Ivanovo, 52.8 per cent in Yaroslavl, 38.5 per cent in Perm.

When we compare absolute increase in the population on the territory which is now the U.S.S.R. in 1913 and in 1930 with the corresponding figures for the whole of capitalist Europe, we see that while the increase in the population in the U.S.S.R. in 1930 rose by almost 30 per cent, as compared with 1913, in capitalist Europe the rate of increase in 1930 declined by almost 10 per cent as compared with 1913. The annual natural increase in the population of the U.S.S.R. is now almost equal to the total natural increase in the rest of Europe, while before the war it was about one-third less.

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* In 1928 there were 293 towns in the U.S.S.R. with water-supply systems, and in 1932 there were 367 such towns; sewage systems existed in 36 towns in 1928 and in 55 towns in 1932. Tram lines existed in 39 towns in 1928 and in 50 towns in 1932. Forty-one towns had autobus service in 1928 and 117 towns in 1932.

The radical and irreconcilable difference between the capitalist and the socialist systems of national economy thus finds its expression also in the fact that the 160 million of the U.S.S.R. population shows the same annual increase as the 360 million population of the capitalist countries of Europe.

The decline in the mortality as a result of the successes of socialist construction is accompanied by an increase in the span of life of the toilers of the U.S.S.R.

In tsarist Russia the average life of a man in 1907-10 was only 31.9 years; in the Soviet Union the average rose to 41.9 as early as 1926-27. The average life of a woman was 33.9 years in 1907-10 and 46.8 years in 1926-27.

Only the Soviet Government, under the leadership of the Leninist Communist Party, could attain such enormous successes in the reconstruction of the entire country, which led to the unprecedented rise of the material and cultural level of the working class and the masses of the rural population, to the decline of sickness and mortality and to the increase in the span of life.

The elimination of unemployment, the elimination of the possibility of differentiation among the toiling rural population as between poor and prosperous, the elimination of poverty and pauperism, the elimination in the first Five-Year Plan period of the bases and sources of exploitation of man by man, the resulting unprecedented growth of the material well-being of the working class and the rural masses of toilers—this is what the Soviet Union puts forth in contrast to the capitalist world with its ever greater exploitation of the workers, dooming half of the working class to long periods of unemployment, as a result of the crisis, with its absolute impoverishment of the working class and the ruin of the peasant masses, with its increased oppression of the colonial populations representing two-thirds of humanity still in the position of colonial slaves.

COMMODITY CIRCULATION*

THE absolute predominance of socialist relations in national economy, the progress of industrialization, the fact that the majority of petty commodity producers in the countryside have adopted socialist forms of production, that the link between the working class and the peasantry on the basis of production has become the basic form of the bond between town and countryside, and that the quantity of goods for mass consumption has greatly increased during the Five-Year Plan period—all these factors have resulted in the trade connection between city and village being raised during the Five-Year Plan period to a new and higher stage. Both in the cities and in the countryside, State and co-operative trading has now been assured a dominant position and a systematic struggle is being waged to abolish speculation in trade.

The material basis for the growth of commodity circulation during the first Five-Year Plan period was provided by the considerably increased quantity of commodities concentrated in the hands of the State. In 1932 the gross production of the industries producing articles of consumption (Group "B") amounted to 187.3 per cent of the 1928 output. At the end of the first Five-Year Plan period, the bulk of industrial and agricultural commodities were concentrated in the hands of the proletarian State. The output of the most important articles of mass consumption produced by State industries has steadily increased during the Five-Year Plan period. In 1932 the commodities produced by the group of textile industries amounted to 143.7 per cent of the 1928 figures, leather footwear to 259.3 per cent, rubber footwear to 209.4 per cent, kerosene to 204.5 per cent, canned goods to 459.6 per cent.

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* Commodity circulation in the U.S.S.R. covers only a part of the output of industry and agriculture. The distribution of means of production, raw materials, fuel, etc., in the socialized sector is not a part of commodity circulation; nor is the output of agriculture that is acquired by the State and co-operative organizations in one form or another included. The retail commodity circulation in the U.S.S.R. includes only those manufactured goods and food products which are acquired by the population through the retail trade system and the system of public catering for individual consumption. The volume of commodity circulation in the U.S.S.R. is considerably smaller than the volume of the output of industry and agriculture. In comparing the commodity circulation of the U.S.S.R. with that of capitalist countries it must be borne in mind that in the U.S.S.R. all goods pass through the retail trading system only once. Hence, changes in the retail commodity circulation in the U.S.S.R. fully reflect changes in the physical volume of the mass of commodities that pass through the trading system to the consumer.

There has also been a considerable increase in the commodity supplies of agricultural products concentrated in the hands of the socialized sector.

The quantity of grain collected by the State increased from 12.1 million tons in 1928-29 to 23 million tons in 1931-32, *i.e.*, it has almost doubled. Moreover, 75 per cent of the grain collected in 1931-32 came from the socialist (State and collective farm) sector of agriculture.

The amount of meat collected by the State (measured in live weight) increased from 1,778 thousand tons in 1928 to 2,819 thousand tons in 1931, *i.e.*, by 58.5 per cent. There has also been a considerable increase in the quantity of other agricultural products collected by the State.

Besides this, the organization of suburban farms run by the consumers' co-operatives in conjunction with the factories and works has made it possible to supply considerable additional quantities of agricultural products.

Retail commodity circulation has also increased during the first Five-Year Plan period, in response to the growth in the country's commodity resources. In 1932 the retail circulation of socialized trade (State and co-operative), including the public catering service, reached a total of 39.9 billion rubles, the turnover of the public catering service amounting to 4,385 million rubles. In 1932 the total volume of commodity circulation amounted, at fixed prices of socialized trade, to 175 per cent of the 1928 figure.

If we take only the supplies of commodities used for individual consumption, the increase in the volume of the commodity circulation of socialized trade in 1932 amounts, at fixed prices, to 188.5 per cent of the 1928 figure.*

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* In reckoning thus, we exclude the agricultural means of production which passed through the channels of retail trade in 1928. The reason for this is the entirely different means used in 1932 for supplying machinery and other means of production to agriculture, in view of the transition of agriculture from the petty peasant form of production to large-scale collective farming.

Aiming as it did at socializing commodity circulation, the Five-Year Plan provided for an expansion of State and co-operative trade, accompanied by a 40 per cent reduction in the relative importance of private trade, with a corresponding shrinkage in the private retail trading system.

During the four years of the first Five-Year Plan period, the provisions of the Plan were surpassed. In 1928, the private trader controlled 20 per cent of the total circulation; in 1930 this figure fell to 5.6 per cent; while by 1931 the percentage of private trade fell still lower and the turnover of the private trader had become a negligible quantity. The process of replacing private trade by socialized trade, which forms an integral part of the general socialist offensive in the whole economic life of the country, has been a highly intensive one. This may be seen from the following figures which show the shrinkage in the private retail trading system during the Five-Year Plan period. The following are the numbers of private retail trading units, trading only in shops (in thousands):

January 1, 1929	163.9
January 1, 1930	47.1
January 1, 1931	17.7

By the beginning of 1932, private retail trading at fixed places had entirely disappeared. The function of the private trader as a middleman has thus been eliminated; the remnants of this class degenerated into speculation, which is prohibited by law.

The final consolidation of State and co-operative trade in the sphere of circulation was made possible by the country's success in strengthening the socialist forms of economy in town and countryside. The collectivization of agriculture and the rout of the *kulaks* as a class, coupled with the fact that private capitalist enterprise has been eliminated in industry and that the overwhelming majority of artisans and handicraftsmen have united into co-operative enterprises has cut the ground from under private trade.

The abolition of private trade represents a tremendous victory of socialism. It signifies the elimination of private capitalist trading profit; it frees the working population from the necessity of buying consumers' goods at exorbitant prices for the benefit of parasites, and ensures the trade connection between the working class and the peasantry being strengthened and raised to a higher stage.

In accordance with the instruction of the Fifteenth Congress of the Communist Party the ousting of private trade from the market was accompanied by the simultaneous growth and strengthening of the commodity carrying network of co-operative and State trade. The number of trading units of the socialized trading system (co-operative and State) increased during the first Five-Year Plan period by 155,700. At the end of the first Five-Year Plan period the retail system of co-operative and State trade, including the trading system of the collective farms, had 312,400 trading units.

It should be borne in mind in this connection that the trading establishments of the State and co-operative trading system, formed to replace the private trading establishments which have been abolished, considerably exceed the latter in point of size. Thus, the average turnover per private trading unit in the beginning of the first Five-Year Plan period, despite the fact that prices here were much higher than in the State trading establishments, represented only one-fourth of the average turnover per trading unit in the socialized trading system.

The number of units in the system of socialized trading in the villages increased by 91,300 during the first Five-Year Plan period, there being 179,300 of these units on January 1, 1933. At the beginning of the first Five-Year Plan period the trading system in the villages was feeble and inadequate, owing to which the village population was compelled to make a considerable part of their purchases in the towns. The fact that the system of socialized trading in the villages has been doubled has made it possible to solve the problem of bringing the mass of commodities closer to the village consumer.

The number of units in the socialized trading system in the towns increased by 64,400 during the course of the Five-Year Plan period and by January 1, 1933, there were 133,100 trading units. The trading system of the socialized sector, developed in the towns during the Five-Year Plan period, is radically different from the former system of private trade. The development of State and co-operative trade has been accompanied by an enlargement of the trading units and the creation of large specialized and department stores, as a result of which the service to the consumer has been greatly improved. Meanwhile a large number of trade enterprises have been shifted from the centre of the cities to the working class suburbs. This has done away with that excessive concentration of trade in the centre of cities, which is characteristic of capitalism, and secured regular service by the trading apparatus to consumers living in factory districts and on the outskirts of cities. A trading system has also been developed in the newly founded cities, on new construction jobs and in new workers' settlements.

Hand in hand with the growth of co-operative and State commodity circulation, the supply of technical equipment has been augmented and supplemented by new technical equipment of superior quality. There has been a considerable increase in the storage accommodations of the trading system; the number of elevators increased in four years from 224 to 587, *i.e.,* 2.6 times, their total capacity being 1,841 thousand tons at the beginning of 1933. The capacity of the cold storage accommodation rose from 81,700 tons to 172,000 tons. A widespread system of specialized wholesale bases has been developed in the various regions and districts for all the most important food products and articles of mass consumption.

The most powerful and highly developed system of socialized trade is the consumers' co-operative organization, which concluded the first Five-Year Plan with a number of big achievements to its credit. The Fifteenth Congress of the Communist Party pointed out that the co-operatives were "confronted with the task of extending their service to ever larger circles of the population and must develop into the cheapest and most rational apparatus for conveying commodities from the producer to the consumer. By attracting the masses in an organized fashion to take part in their economic work, the co-operatives should help to ascertain the consumption requirements of the population and to cater to these requirements in a planned way."

The principal results of the work of the consumers' co-operatives are as follows: the number of members of consumers' co-operatives rose from 24.7 million on January 1, 1929 to 73.1 million on January 1, 1933. The average share rose during the same period from 8 rubles 72 kopeks to 27 rubles 70 kopeks. The share capital rose from 183.3 million rubles on October 1, 1928, to 2,006.5 million rubles on January 1, 1933, whereas the Five-Year Plan called for an increase in the share capital to 1,424 million rubles by the end of 1933. The trading system of the consumers' co-operatives increased from 94,200 units on January 1, 1929 to 200,100 units on January 1, 1933.

The consumers' co-operatives include among their members three-fourths of the adult population of the U.S.S.R. Their trading system has more than doubled. The consumers' co-operatives have a vast share capital at their disposal.

During the first Five-Year Plan period the consumers' co-operative organization reorganized the smaller units of its apparatus with a view to bringing them into closer contact with industry. In order to improve the service to the workers in the leading branches of national economy, above all in the most important branches of industry, closed workers' co-operatives and closed co-operative stores were organized, which were later extended to all branches of economy. In order to satisfy the consumption requirements of those working under special conditions (railway and water transport, peat and fishing industries, State farms) the co-operative organization formed special autonomous sections to deal with these branches. All this has made it possible to bring the co-operatives' work of trading and supply into line with the requirements of industry, to extend the mobilization of the local commodity resources and to attract greater numbers of the broad masses to take part in the work of the co-operatives.

Besides developing its trading and distributing system, the consumers' co-operative organization has also made considerable progress in the organization of subsidiary enterprises the development of which dates back to 1929-30.

The main data showing the development of these subsidiary enterprises are as follows:

	1930	1932
Area under vegetables, including potatoes (in thousand hectares)	44.7	466.8
Vegetable harvest, exclusive of potatoes (in thousand tons)	145.8	1,830.2
Potato harvest (in thousand tons)	112.5	700.0

	1930	1932
Hothouse farming (in thousand frames)	300.0	2,878.1
Vegetable and fruit preserving (in thousand tons)	102.5	526.6
Bread baking (number of bread factories and mechanized bakeries)	180.0	298.0
Output of bread factories (in thousand tons)	3,512.0	6,257.0
Percentage of urban population served by mechanized bread baking	*52.1*	*88.8*

In addition to this, the consumers' co-operative organization owns a vast network of public catering establishments, a large quantity of livestock on its suburban farms and many other subsidiary enterprises.

The great development of this powerful organization was made possible by large capital investments, which amounted to 1.1 billion rubles during the Five-Year Plan period.

The overhead expenses of the consumers' co-operatives, which in 1929 amounted to 17.08 per cent of the total turnover, had declined to 13.38 per cent of the turnover by 1932.

The level of overhead expenses is considerably lower in the U.S.S.R. than in capitalist countries. Thus, in Germany and in the U.S.A. the consumer in purchasing commodities in retail stores, pays 30 to 35 per cent to cover the expenses of wholesale and retail trade.*

The low cost of the trading and distributing apparatus of the U.S.S.R. is due to the fact that the abolition of capitalist trade and the competition which it involves has resulted in the elimination of expenses necessitated by this competition. Thus, expenses on advertising, which absorb unproductively an enormous proportion of the national income in capitalist countries, have been done away with entirely. In spite of this, the present level of overhead expenses in the U.S.S.R. can be still further reduced, if we take into account the advantages of planned economy and the socialization of the sphere of circulation, which make possible a considerably greater degree of rationalization and a reduction in cost of the trading and distributing work. One of the most important tasks of socialized trade in the future is that of reducing the overhead expenses in trade.

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* According to the data of the *Bureau of Business Research* in Harvard University Bulletin, No. 83, the overhead expenses of the department stores in the U.S.A. in 1929 amounted to 30 per cent of the turnover and in the department stores selling clothing and household goods to 33.1 per cent. According to estimates of Prof. Hirsch, the average level of overhead expenses in the retail trade of Germany amounted in 1929 to 23.7 per cent of the turnover. Moreover, as Hirsch points out, as a result of the crisis, there is a tendency towards a higher level of overhead expenses (Julius Hirsch and Karl Brand, *Die Handelsspanne,* Berlin, 1931). The overhead expenses of wholesale trade in Germany on various commodities, according to *Forschungsstelle für den Handel, Mitteilungen,* No. 10, 1933, amount to from 7.8 to 18.4 per cent of the turnover.

The great achievements of the consumers' co-operatives make it possible squarely to tackle the problem of improving the quality of their work and of raising the cultural level of the trading and distributing apparatus. In this connection the main thing is for the consumers' co-operatives to fight hard for a greater variety and higher quality of consumers' goods, to urge matters in this direction with State industry and the handicraft co-operatives, and carefully to study the various requirements of the consumers in town and country and in all the numerous districts of the U.S.S.R.

The extension of the commodity circulation has also resulted in a marked growth of State trade which has gone hand in hand with the growth of the consumers' co-operatives. The State trading system, which comprised 14,700 trading units on January 1, 1931, had developed at the end of the Five-Year Plan period (on January 1, 1933) to 70,700 trading units, *i.e.,* it increased almost five times in two years. The development of the State trading system took the form, both of the opening of retail stores by syndicates of the State light and food industries for the direct sale of commodities produced by these industries to the consumers, and also of the opening of large department and specialized stores as part of the general State trading system.

The development of State and co-operative trade has led to a speeding up in the commodity circulation and ensured better satisfaction of the requirements of the broad masses in town and countryside.

With a view to further improving the organization of supply to the workers and of securing the most expedient utilization of the supply of food and industrial products in the interest of socialist construction, the workers' co-operatives of the largest enterprises in the various branches of industry were detached from the system of the *Centrosoyuz** and special departments to deal with workers' supplies were created as part of the factory management.

* Central Union of Consumers' Co-operative Societies.

Another important factor in improving the workers' supplies was the system by which large enterprises have established their own food base, the assignment of certain State farms to this or that plant and a widespread development of decentralized collections of agricultural products.

The development of commodity circulation, the strengthening of State and co-operative trade and the expansion of collective farm trade—all these factors have become a powerful weapon in the hands of the proletarian State for raising the material welfare of the working masses and for securing a considerable increase in the supply of consumers' goods to the population.

The growth of socialized commodity circulation has brought about a considerable increase in the consumption of the working population in the cities and villages. The total volume of socialized commodity circulation in articles of individual consumption amounted at the end of the Five-Year Plan period to 198.7 per cent for the towns and 165.7 per cent for the countryside as compared with 1928. It should be borne in mind that this increase in the commodity circulation does not fully reflect the increase in the consumption of the working masses in the towns and villages, inasmuch as radical changes have occurred during the Five Year Plan period in the class composition of the urban and rural population.

The rout of the *kulak* class in the countryside, the abolition of capitalist enterprise in the cities, the elimination of the middleman in trade—all this has resulted in the elimination of consumption by parasitic elements. For this reason, the real increase in the quantity of basic food and industrial products consumed by the working population in town and country is greater than is reflected by the growth of commodity circulation. Particularly marked has been the rise in the level of consumption of the poorest strata of the urban and rural population. Among the urban population in 1932, totalling 38.7 million, 10 million persons represented new workers and their families who had previously been living in the countryside, who belonged to the poorest and middle peasantry, and whose level of consumption was considerably lower than that of the industrial workers. The level of material welfare of this vast army of new workers has undergone a marked rise upon their migration to the towns.

A decisive factor in raising the level of material welfare of the masses has been the collectivization of agriculture. The transition to collective labour and the socialization of the means of production has radically changed the conditions of existence of the poor and middle peasantry. The poor peasant of yesterday, today a collective farmer with equal rights in the collective farm, has risen from the position of a semi-starved being to the standard of living of the middle peasantry.

One very important lever for improving the material welfare and standard of living of the toiling masses has been the public catering service.

The creation of an extensive network of public catering establishments represents one of the greatest achievements of the first Five-Year Plan. The proletarian State, which views the transition of the toilers from individual household economy to large-scale socialized economy as a process of tremendous importance for the socialist reconstruction of the mode of living and for raising the material and cultural level of the masses, has devoted special attention to the task of developing the public catering service.

During the four years of the first Five-Year Plan period, the number of establishments of the public catering service in the towns in the system of the *Centrosoyuz* and the People's Commissariat of Supply has increased from 1,500 to 13,982, including factory-kitchens, whose number has increased from 3 to 106. The number of workers served by these public catering establishments has increased in the urban sector from 750,000 at the end of 1928 to 14.8 million at the end of 1932, *i.e.*, twenty times. The output of the public catering establishments comprised in these two systems has increased from 2.2 million dishes a day in 1928 to 29 million dishes a day in 1932.

The Five-Year Plan for public catering provided for an increase in the number of workers served by public catering establishments from 750,000 to 2.3 million. The provisions of the Five-Year Plan as regards the number of people to be served have thus been exceeded more than six times.

According to the Plan, 20 per cent of the total number of workers employed in factories were to have been served by public catering. Actually, however, the public catering service was extended by January 1, 1933, to from 65 to 75 per cent of the workers in the most important branches of economy. The following table shows the scope of the public catering service among individual groups of workers and students in the beginning and at the end of the first Five-Year period:

Percentages of those served by public catering in relation to total number of workers

	January 1, 1928	January 1, 1933
	(in percentages)	
Metal workers	16.0	75.0
Building workers	6.4	74.0
Transport workers	3.4	68.0
Miners	11.4	72.5
Pupils in all schools	—*	71.2
University students	—*	75.5

In addition to the growth of public catering in the towns,** public catering has also developed at a rapid rate in the countryside.

The system of the *Centrosoyuz* on State farms, machine and tractor stations, in lumber camps and peat working camps, comprised in 1932 12,500 dining rooms with a total daily capacity of 5.24 million dishes, having thus secured the extension of the public catering service to from 85 to 90 per cent of the permanent and seasonal workers.

In addition to this, a large network of public catering establishments, serving a total of four million dishes per day, has been developed in the collective farms (according to the data of the *Centrosoyuz).*

The total turnover of the public catering system, in both the urban and rural sectors, increased from 102 million rubles in 1928 to 4,385 million rubles in 1932.

During the four years of the Five-Year Plan period the number of workers and employees in the public catering establishments of the *Centrosoyuz* and People's Commissariat of Supply, both in urban and rural sectors, increased from 25,700 in 1928 to 530,000 in 1932.

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* Not available

** The development of public catering in the towns is not fully reflected in the above figures. These figures show only the work of the two most important systems of public catering (*Centrosoyuz* and the People's Commissariat of Supplies) but they do not include the large growth of the public catering service in the systems of the handicraft co-operatives or in the dining rooms organized through the initiative of various groups.

The following institutions have been opened during the first Five-Year Plan period: ten scientific research institutes engaged in studying the problems of public catering; three higher educational institutions and twenty-three technicums to train engineers and technologists, chemists and economists for work in the public catering service. The necessary conditions have thus been created for improving the quality of the food and for placing the work of public catering on a scientific basis.

The gigantic growth of the public catering service during the first Five-Year Plan period has placed in the hands of the proletarian State a mighty lever for transforming those habits of work and life which the broad working masses have inherited from the days of the old economic regime. It permits great advances being made in the emancipation of woman, who, in the words of Lenin, has been "oppressed, smothered, dulled and degraded by the petty household cares," which "fetter her to the kitchen and to the nursery, wasting her labour on work which is unproductive to the point of savagery, petty, dulling, nerve-racking and stupefying." By releasing millions of people from the cares of household drudgery, public catering ensures the possibility of utilizing the labour power, which has thus been set free, at productive work, and in this way helps to speed up the tempo of development of the productive forces.

On the basis of the development of State industry and of large-scale agricultural production, which has placed enormous stocks of industrial and agricultural goods at the disposal of the State, on the basis of the growth of commodity circulation between town and countryside, of the ousting and abolition of private capitalist trade and of the increased strength of the State and co-operative trade, Soviet trade is rapidly expanding in the U.S.S.R.—trade without capitalists, without speculators or middlemen. As a result of the first Five-Year Plan, trade in the U.S.S.R. has been raised to a new and higher stage.

The victory of collectivization in agriculture in the U.S.S.R. has created the necessary conditions for the successful development of a new type of Soviet trade—collective farm trade.

Collective farm trade represents a form of trade contact between the producer and the consumer without the interference of the private middleman, without capitalists or speculators. Collective farm trade is, on the one hand, an important lever for the economic strengthening of the collective farms and the increased welfare of the collective farmers; and on the other hand, it ensures the development of commodity circulation between city and countryside and improves the supplying of the workers with agricultural products and of the collective farmers with city products. Collective farm trade, which was introduced at the beginning of 1932, has undergone considerable development and has become one of the vital factors in supplying the towns with food products. Thus, according to the estimates of the purveying organizations, in 1932 the co-operatives and State organizations alone procured 120,000 tons of meat, 130,000 tons of milk and dairy products, 360,000 tons of potatoes, etc., on the collective farms and at collective farm markets.

The growth of Soviet trade, the strengthening and development of the trade link between the working class and peasantry on the basis of the socialist industrialization of the country and the collectivization of agriculture, and the strengthening of the form of the bond based on production, have proved the complete bankruptcy of the Right opportunists, who waged an active struggle against industrialization and collectivization, who counterposed the link between town and countryside on the basis of trade to the link on the basis of production, and who were dragging the country towards a policy of developing the capitalist-*kulak* elements in production and trade.

The results of the Five-Year Plan in the sphere of trade and of the increased material welfare of the working population have once and for all exposed the counter-revolutionary calumny of the Trotskyists, who predicted an inevitable rupture of the bond uniting the working class with the peasantry. These results have also proved the complete ineptitude and harmfulness of the anti-Leninist "Left-wing" phrase-mongering regarding the transition to the direct barter of products and the "withering away" of money already at the present stage of socialist construction.

The tremendous growth of industrial production, the radical reconstruction of the various branches of the light and food industries and their emancipation from dependence on abroad in respect of equipment and raw materials, the strengthening of the production and trade link between the working class and the peasantry on the basis of industrialization and the collectivization of agriculture and on the basis of Soviet trade—all these achievements of the first Five-Year Plan ensure a further and even more rapid increase in the production of consumers' goods and in commodity circulation during the second Five-Year Plan period.

FINANCES

THE victory of the socialist forms of economy, the elimination in the main of the parasitic classes with their unproductive consumption, the growth of the national income, particularly of its socialized part and the resulting growth of the welfare of the toiling masses have enabled the Soviet State to effect socialist accumulation of such scope as secured the solution of the basic tasks of the first Five-Year Plan, the industrialization of the country on the basis of modern advanced technique, the socialist reconstruction of agriculture and the strengthening of the defensive capacity of the country.

The growth of socialist accumulation of capital was manifested in the fact that the resources of the unified financial plan* exceeded the amount set in the FiveYear Plan by 31.1 per cent. For the period of five years, the revenues of the unified financial plan were set at 91.6 billion rubles** but actually they amounted during four years to a total of 120.1 billion rubles. The revenues of the national budget of the U.S.S.R. (exclusive of that part of the revenue of the People's Commissariat of Railways which was used to meet the operating expenses) were set by the Five-Year Plan at 45.2 billion rubles. Actually they amounted in four years to 72.8 billion rubles, *i.e.,* they exceeded the provisions of the Plan by 60 per cent. The revenues of the unified financial plan are classified, according to their source, as follows:

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* The unified financial plan, as distinguished from the State budget which forms part of it, includes all monetary accumulations of the socialized economy (profits, turnover, tax, contributions paid by the economic organizations calculated on the basis of their pay rolls), and resources of the population (taxes, State loans, shares, deposits in savings banks, etc.), and all the expenditures for capital investments, the increment of turnover resources in production and circulation, as well as expenditure for cultural needs and administration.

** In the published material on the Five-Year Plan the total involved in the financial plan was given as 86 billion rubles, including only the net balance (the difference between the payments by and payments to the population) on State insurance and loans. For purposes of comparison with the actual realization, these two items of the financial plan were extended, the total thereby increasing by 5.6 billion rubles.

Revenues distributed according to source

	Set by Five-Year Plan	Realized in 4 years	Excess over Plan figure
	(in billion rubles)		
A. Total revenues from socialized economy	70.9	89.9	+*19.0*
Including:			
a) Industry	33.5	43.4	+*9.9*
b) Transport and communication	5.7	9.0	+*3.3*
c) Municipal and housing services	2.9	3.2	+*0.3*
d) State trading and co-operative organizations	6.1	8.4	+*2.3*
e) Social insurance (contributions of economic organizations based on percentage of wages)	10.1	12.4	+*2.3*
B. Mobilized resources of population (obligatory and voluntary payments)	17.3	21.5	+*4.2*
C. Miscellaneous (local taxes, funds of public organizations, etc.)	3.4	8.7	+*5.3*
Total revenues	91.6	120.1	+*28.5*

These figures show that 74.9 per cent of the total revenues of the unified financial plan came from socialized economy. Mobilized resources of the population constituted 17.9 per cent, and all other revenues 7.2 per cent.

Thus, the basic source of the revenues of the unified financial plan were the accumulations of the socialized economy, which were a net result of the general growth of production, of labour productivity, and allowances for depreciation used for capital investments in the respective branches of economy. Although the enlisted resources of the population in the form of obligatory payments and voluntary contributions exceeded the amounts called for by the Five-Year Plan, their share in the total revenues of the unified financial plan was reduced from 18.9 per cent, as provided for in the Five-Year Plan, to 17.9 per cent. This shows that the surpassing of the plan in the financing of all expenditures was based, in the main, on the increased accumulations of socialized economy and only to an insignificant extent on the enlistment of additional resources of the population.

The redistribution of the resources of the unified financial plan in accordance with the tasks of the Five-Year Plan was effected in the main through the State budget. Of the 120.1 billion rubles mentioned above, 72.0 billion rubles, or 60 per cent of all the revenues of the unified financial plan, were redistributed through the State budget. In the revenues of the State budget of the U.S.S.R. the funds of socialized economy amounted to 60 billion rubles or 82.6 per cent and the mobilized resources of the population to 10 billion rubles (exclusive of the amounts transferred to the local budgets) or 13.9 per cent. These figures are evidence of the fact that the State budget of the U.S.S.R. is, first of all, the budget of the whole socialized economy. The local revenues in the local budgets in the U.S.S.R., in addition to the funds received from the State budget, amounted to 10.8 billion rubles, of which the revenues raised from local enterprises amounted to 5 billion rubles or 50 per cent and the mobilized resources of the population amounted to 4 billion rubles or 40 per cent.

Thus, the budgetary system of the U.S.S.R. mobilized and disbursed 82.8 billion rubles, or 69 per cent of all the resources of the unified financial plan. The remaining part of the resources were in part redistributed by means of the credit system, but in the main were distributed directly by the different branches of economy.

While the revenues of the budget from socialized economy were based on the growth of the accumulations of the latter, the mobilization of the resources of the population was based on the tremendous growth of the monetary income.

While the monetary income of all groups of the population has increased between 1928 and 1932 three and a half times and the income of the workers and employees four times, the growth of payments of the mobilized resources of the population developed more slowly. For this reason the ratio of the mobilized resources to the total monetary income of the population in 1932 remained on the level of 1928, in spite of the absolute increase in the amount of the payments. In the mobilized resources of the population the share of the voluntary payments, particularly of the payments on the State loans, has increased. During four years these payments reached the total of 6 billion rubles, as against the 4.3 billion rubles called for by the Five-Year Plan.

This surpassing of the Plan was obtained both as a result of enlisting a larger number of the toilers in support of the loans as well as by a rise in the average amount paid by the subscribers. Thus, the Third Industrialization Loan (in 1929) was subscribed to in the cities by 10 million people, the average subscription amounting to 65 rubles, while the Loan of the Fourth and Final Year of the Five-Year Plan (in 1932) was subscribed to in the cities by 23 million people to an average amount of 93 rubles.

As a result of this, the income from the payments on subscriptions to State loans by the urban population alone increased from 648 million rubles in 1929 to 2,000 million rubles in 1932.

An important part in the organization of the accumulation of the funds of the population was played by the savings banks the number of the depositors in which has risen during the Five-Year Plan period from 3.6 million to 30 million, or 8.5 times.

The income from the obligatory payments of the population exceeded the amount set by the Five-Year Plan by 1,654 million rubles, of which 813 million rubles came from the rural population and 841 million rubles from the urban population.

The overfulfilment in this group of payments as against the plan was the result of the growth of the monetary income of the urban and rural population.

The taxation system extends considerable privileges to the collective farm sector of agriculture and to the lower income groups of the urban population.

The character of the taxation policy of the Soviet State is shown clearly by the size of the payments on the agricultural tax per household and on the income tax for the individual groups of the urban population. Thus, in 1932, the agricultural tax per household of a collective farmer, including the payments of the collective farm as a whole, was 13.7 rubles per household, of an individual farmer 27.5 rubles and of a *kulak* 350 rubles.

In the cities the income tax varied in percentage to the incomes of the respective groups from 0.83 per cent for workers, employees and artisans—members of industrial co-operative associations—whose monthly earnings do not exceed 100 rubles, to 3.5 per cent for those who earn 500 rubles and more. For independent artisans who do not employ wage labour, the average tax rises to 10 per cent, while for those who employ wage labour, the tax is raised to 25 per cent and for the non-toiling elements of the population up to 36 per cent.

The overwhelming part of the resources of the unified financial plan and of the budget was used for productive purposes, for economic and cultural construction, and not for the maintenance of the State apparatus or for military purposes as is the case in the capitalist countries.

The following data reflect the general character of the utilization of the resources of the unified financial plan. Of the total expenditures for five years as provided for by the Five-Year Plan, the financing of national economy was set at 56.8 billion rubles, or at 62 per cent of the total expenditures; the financing of social and cultural measures at 21.4 billion rubles or 23.4 per cent of the total.

Actually, however, in four years the national economy was financed in the unified financial plan to the extent of 80.3 billion rubles, or by 23.5 billion rubles more than was called for by the Five-Year Plan. The share of the expenditures for the financing of the national economy rose to 66.0 per cent as against 62 per cent called for by the Five-Year Plan. Industry and electrification received additional financing to the extent of 19.6 billion rubles and agriculture to the extent of 7.8 billion rubles.

The additional financing of agriculture was in the nature of financial aid to the new social system in agriculture (State farms, collective farms, machine and tractor stations) by the proletarian State. Of the total investments in the socialist sector of agriculture during four years to the amount of 14.7 billion rubles, the State provided 12.8 billion rubles, or 81.8 per cent of the total investments, through the budget and credit systems. The share of the State in the financing of the State farms amounted to 90 per cent, of the collective farms to 64.5 per cent and of the machine and tractor stations to 66.7 per cent of all the expenditures on these sectors.

The disbursement of the funds of the State budget of the U.S.S.R. in the principal directions (national economy, culture, administration, defence, etc.) was as follows (in billion rubles):

	Provided for by the Five-Year Plan	Actual disbursements during Five-Year Plan	Excess over the Plan
1. Total financing of national economy .	23.4	50.2	+26.8
Including:			
a) Industry and Electrification . . .	8.1	23.0	+14.9
b) Agriculture	3.4	8.5	+5.1
c) Transport and Communication .	9.1	10.4	+1.3

	Provided for by the Five-Year Plan	Actual disbursements during Five-Year Plan	Excess over the Plan
2. Total financing of cultural services	4.1	4.6	+0.5
Including:			
Education	3.3	4.1	+0.8
3. Expenditures for administration and defence	7.2	6.9	—0.3
4. Expenditures for State credits	2.7	2.1	—0.6
5. Transfers to local budgets	6.7	5.3	—1.4
6. Miscellaneous	1.1	2.9	+1.8
Total disbursements	45.2	72.0	+26.8

In the disbursements of the State budget of the U.S.S.R. the financing of national economy amounted to 70 per cent of all the expenditures, as against 53.9 per cent called for by the Five-Year Plan. The expenditures on social and cultural services amounted to 23.9 billion rubles, of which 4.6 billion rubles came from the state budget, and 8.3 billion rubles from the local budgets, as against 6.9 billion rubles called for by the Plan, and 77.1 billion rubles for social insurance. Together with the expenditure of the economic organizations for the training of cadres, on schools and hospitals, the financing of social culture services, amounted to 26 billion rubles.

The financing of cultural upbuilding from the State Budget, local budgets and the social insurance budgets for 1932-33, *i.e.*, the final year of the Five-Year Plan period, was set by the Plan at 5,730 million rubles, with an increase as against 1927-28 of 2.6 times. Actually, the appropriations from these sources in 1932 for social and cultural measures amounted to 7,450 million rubles, an increase of 3.4 times as against 1927-28.

The Five-Year Plan called for an expenditure of 24.53 rubles for social and cultural purposes in 1932-33 per capita, of which 15.28 rubles was to have been used for education and 7.48 for health protection.

Actually the expenditures in 1932 for these purposes amounted to 61.73 rubles per capita, *i.e.*, 2.5 times as much as was set for the last year by the Five-Year Plan.

The expenditures on education in 1932 amounted to 38.64 rubles per capita, or 2.53 times as much as was called for by the Five-Year Plan for the final year of the Plan.

The expenditures on health protection in the same year amounted to 12.65 rubles, or 1.7 times as much as was set for 1932-33 by the Five-Year Plan.

In comparison with these huge expenditures on social and cultural measures in the U.S.S.R., the expenditures of pre-revolutionary Russia were next to nothing, as is vividly shown by the following figures:

Expenditures on	1913*		1932	
	Total (in million rubles)	Per Capita (in rubles)	Total (in million rubles)	Per capita (in rubles)
Education	239.7	1.73	6,410.6	38.64
Health protection	94.7	0.69	2,105.8	12.69
Labor protection and social welfare	99.6	0.72	1,725.5	10.40
Total	434.0	3.14	10,241.9	61.73

The total financing of social and cultural services has secured a large increase in the number of students in all fields of mass education and in the training of cadres and the realization of obligatory universal education. It has resulted in increased wages to the workers, in social and cultural institutions and in improved service to the toilers by hospitals and particularly by prophylactic institutions (health resorts, sanatoria, rest homes, etc.). It has resulted in a considerable improvement in the material care for the pupils: hot breakfasts for children, textbooks, scholarships, etc. It has resulted in the extensive development of all forms of cultural construction (clubs, palaces of labour, schools, higher schools, theatres, cinemas, radio, etc.).

The growth of the expenditures on social and cultural measures was most rapid in the national minority republics which are liquidating the cultural backwardness inherited from tsarism at a rapid pace and are creating their own culture, national in form and proletarian in content.

Thus, while the expenditures on social and cultural measures in the local budgets of the U.S.S.R. as a whole have increased 3.4 times, the increase in individual republics is characterized by the following data:

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* Figures for 1913 are for the territory contained within the borders of what is now the U.S.S.R.

	R.S.F.S.R.	Ukrainian S.S.R.	White Russian S.S.R.	Transcaucasian S.F.S.R.	Uzbek S.S.R.	Turkmenistan S.S.R.	Tadjikistan S.S.R.
Expenditures in 1932 in %% to 1927-28	316.6	347.9	433.6	408.4	656.5	755.1	3,800
Share of expenditures on social and cultural measures in local budgets:							
In 1927-28	39.8	38.9	35.9	49.8	34.2	34.5	20.5
In 1932	50.7	56.7	56.3	57.0	58.1	64.3	55.9

The Republics of Central Asia increased the expenditures on cultural measures in 1932 as against 1927-28, 6.5 times in Uzbekistan, 7.5 times in Turkmenistan, and 38 times in Tadjikistan. In the autonomous republics of the R.S.F.S.R. these expenditures exceed considerably the average increase for the R.S.F.S.R. as a whole, as is evidenced by the following data for 1932 in percentage to 1927-28: the rate of increase for the Kirghiz Autonomous Soviet Socialist Republic was 642 per cent, for the Chuvash A.S.S.R. 406.3 per cent, for the Kazak A.S.S.R. 486.8 per cent, for the Yakut A.S.S.R. 414.2 per cent and for the Bashkir A.S.S.R 390.6 per cent.

These figures are a vivid illustration of the Leninist policy on the national question, consistently pursued by the Communist Party and the Soviet Government.

The mobilization and disbursement of enormous funds during the first Five-Year Plan period was accompanied by the reconstruction of the finance system and of the financial and economic organizations with the aim of enforcing strict cost accounting and of securing the "control through the ruble."

As a result of the credit reform carried through in 1930, the system of acceptances was abolished, a system of direct bank crediting was instituted and all functions of short-term crediting were concentrated in the State Bank. As a result of this, the latter has become the sole centre of short-term credits.

Modifications of the credit reform effected in 1931 liquidated the automatism of bank crediting, established the system of bank credits advanced for definite purposes, and obligated the economic organizations to repay the credits within the agreed time limit, providing them with operating funds for this purpose.

The second important measure in the reconstruction of the financial work was the taxation reform of 1930, which resulted in changing the system of taxing socialized economy, unifying the more than 46 different taxes, which existed previously in the socialized sector, into one tax on the turnover. This reform was determined by the very character of the connections of the budget with the socialized economy and resulted in marked simplification of the whole practice of settling accounts.

During the period of the first Five-Year Plan the currency circulation of the U.S.S.R. has been considerably strengthened. The basis for this was the increased commodity circulation, which reached a total of 39.9 billion rubles in 1932. This commodity circulation is based on stable prices fixed by the State and was carried on through the socialized State and co-operative trading network. The commodity stocks in the hands of the State are the best security for the stability of the Soviet currency, which tis the most stable in the world.

The financial strength of the U.S.S.R. has considerably increased during the period of the Five-Year Plan. New sources of accumulation have arisen and have become consolidated. The income from industry, transport and agriculture has increased.

The increased financial power of the U.S.S.R. stands out in contrast to the monetary and credit crisis in the capitalist countries, which is ever deepening owing to the general crisis. The pound sterling has lost its significance as a world currency, the stability of the dollar has been undermined. The banking system of the U.S.A. has been shaken and is disintegrating. The burden of the crisis and of the growing military expenditures have led to a chronic state of deficits in the budgets of the capitalist countries. Not only have even the largest capitalist concerns and banks become bankrupt, but whole cities and countries have declared a partial or general moratorium on their obligations. On this background of general financial collapse and repudiation of debts, the U.S.S.R. alone has not only maintained but has consolidated its financial strength both within the country and in its relations with the capitalist countries, meeting all its obligations on time.

CADRES AND EDUCATION

"IN view of the necessity of solving the greatest economic, technical and organizational problems of socialist construction, the Fifth Congress of the Soviets charges the Government of the U.S.S.R. with the duty of giving the maximum attention to the questions of culture and of attaining the fulfilment of the most important tasks of the cultural revolution by introducing universal obligatory elementary education, by eliminating illiteracy, by raising the level both of the general and of the technical-vocational education of the masses, by developing cadres of specialists and scientific workers from the ranks of the working class and the toiling masses in general and by adapting the entire system of public education to the tasks of the socialist reconstruction of economy."

Such was the task formulated by the Fifth Congress of the Soviets.

In accordance with this task, it was pointed out in the Five-Year Plan that "the enormous construction program which is to change radically the type and conditions of production in our country, the program based on the most extensive mastery of the latest achievments and best models of the world's technique, squarely puts the question of new cadres, of a new generation of builders who are to become the protagonists of the technical and social reconstruction of our country."*

The significance of the problem of cadres, the significance of the task for the working class to develop its own technical intelligentsia has been repeatedly emphasized all through the period of the first Five-Year Plan in the resolutions and instructions of the Communist Party and the Soviet Government.

At the beginning of the Five-Year Plan period, in 1928, there were 24,200 qualified engineers and technicians employed in industry (excluding the administrative apparatus). This number comprised only 0.92 per cent of the number of workers. The number of engineers working in industry in 1928 was 13,700, or 0.52 per cent of the number of workers, while in Germany, in 1925, the proportion of engineers was 1.38 per cent. In machine building, the proportion of engineers was 1.48 per cent in the U.S.S.R., whereas in Germany it was 3.77 per cent; in the chemical industry, the proportion was about 1 per cent in the U.S.S.R. and 3.14 per cent in Germany.

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* *The Five-Year Plan,* Vol. I, p. 76.

On the railways in the U.S.S.R. there were 16,300 specialists with a higher or secondary education employed in 1928, comprising 1.56 per cent of the number of railway workers. The number of engineers was 4,200 or 0.43 per cent, whereas in the United States, in 1927, the proportion of engineers on the railways was 1.6 per cent, and in Japan it was 0.7 per cent. In agriculture there were only 17,800 specialists in 1928, of whom 9,300 had graduated an institution of higher education and 8,500 had graduated a secondary school. There was less than one qualified specialist to a thousand households.

The dearth of people with secondary education led to a situation where engineers and agronomists had to carry on their work without sufficient assistance from trained technicians.

At the beginning of the first Five-Year Plan period there were 90,000 specialists with higher education working in all branches of national economy. A considerable number among these were old, pre-revolutionary specialists (32,000). There were only 7,000 specialists who had come from the ranks of the workers and 16,000 former peasants. Of 56,000 specialists with secondary education there were 15,000 old specialists and 41,000 who had received their training in Soviet schools. Of these, 8,000 had come from the ranks of the workers and 10,000 from the peasantry. These cadres were obviously insufficient to ensure the fulfilment of the tremendous program of the Five-Year Plan. This situation demanded that means be adopted immediately to develop new cadres.

A summary of the fulfilment and overfulfilment of the Five-Year Plan as regards cadres shows a fulfilment of the Plan as to quantity and a change in the class composition of the cadres of specialists and in their division according to their specialities.

The growth of the number of specialists in all branches of national economy (not including trade school workers, political educational workers and part of the trading and administrative staff) is shown in the following table:

Groups of specialists	Number of specialists					
	With higher education		With secondary education		Total	
	End of 1928	End of 1932	End of 1928	End of 1932	End of 1928	End of 1932
In national economy	90,000	184,500	56,000	190,500	146,000	375,000
In education . . .	26,000	43,200	185,500	344,000	211,500	387,200
Medical cadres . .	63,500	76,000	72,000	135,000	135,500	211,000
Total	179,500	303,700	313,500	669,500	493,000	973,200

In the course of four years, the number of qualified leading cadres in the national economy increased more than two and a half times. Altogether (including social and cultural branches) the number of graduated specialists increased two-fold.

By the end of the first Five-Year Plan period, there were about a million persons in the U.S.S.R. with higher and secondary special education. To these should be added about half a million persons with practical experience in industry, in construction, in the transport system, in agriculture, and more than 200,000 in other branches. Thus, the Soviet intelligentsia numbered about 1.7 million persons by the end of the first Five-Year Plan period, and with those engaged in the branches that have not been included in the data of the report, they numbered more than 2.5 million.

The first Five-Year Plan brought about radical changes in the social composition of the ranks of the specialists. During the Five-Year Plan period the national economy of the U.S.S.R. received 108,000 new specialists with higher education and 176,000 new specialists with secondary education—that is, considerably more than there were at the beginning of the Five-Year Plan period.

Education	In absolute figures			Percentage of total number of graduated specialists		
		Including			Including	
	Total	Workers	Peasants	Total	Workers	Peasants
Higher	108,000	36,700	25,500	*100*	*34.2*	*23.6*
Secondary	176,000	85,500	47,000	*100*	*48.5*	*26.7*
Total	284,000	122,200	72,500	*100*	*43,2*	*25,5*

Over 30 per cent of the new reinforcements of specialists with higher education and about 50 per cent of the new technicians are workers.

Such is the significant result of the first Five-Year Plan in developing a technical intelligentsia out of the ranks of the working class.

The great increase in the numbers of specialists and the radical change in their class features have come as a result of the Bolshevik reshaping of the school. Changes have been made as regards specialization and in improving the social composition of the specialists, as well as in improving the social composition of the student body. This reconstruction was accompanied by a rapid growth of the network of new educational institutions for training cadres.

Types of educational institutions	1928		1932		1932-33	
	No. of educational institutions	No. of students	No. of educational institutions	No. of students	No. of students provided for by the Five-Year Plan	Percentage 1932 as compared with 1928
Academies	1	200	23	9,000	—	*313.3*
Higher general educational and technical institutions .	129	159,800	645	492,300	196,000	
Technicums	1,650	253,600	3,096	949,200	327,000	*374.3*
Workers' colleges .	147	49,200	1,150	444,400	72,000	*905.0*
Factory schools . .	1,814	178,300	3,000	1,177,300	430,000	*660.4*

During the first Five-Year Plan period, an entirely new form of training leading cadres for national economy has been created. Twenty-three academies were organized, with 9,000 students attending (in 1928 there was only the Industrial Academy with 200 students). Particularly rapid was the growth of the number of proletarian elements in the higher and secondary technical vocational schools: from 40,000 (25 per cent) in 1928 the number of workers and workers' children in the higher general educational and higher technical educational institutions rose to about 280-290,000 (58 per cent) towards the end of the first Five-Year Plan period. In the industrial higher technical educational institutions the percentage of workers among the students rose to 70. In the technicums the number of workers and workers' children was 28.6 per cent in 1928-29, and 49.5 per cent in 1932; in the industrial technicums their number rose to 68-70 per cent. This growth of the number of workers in the higher educational and higher technical educational institutions was secured to a great extent by the rapid development of the network of workers' colleges. There are

1.4 million students receiving their training in higher educational and higher technical educational institutions and in technicums. In the course of the next four to five years, *i. e.*, during the second Five-Year Plan period, these students will occupy leading positions in the various branches of national economy and of social and cultural construction.

Even if only the quantitative indices are taken into consideration, it will appear that the U.S.S.R. is ahead of the greatest capitalist countries in the development of higher and secondary education. Thus, in Germany, there were 159,300 students attending institutions of higher education in 1931, whereas in the U.S.S.R. the number of students was 492,300. Of the above-mentioned number of students in Germany only 27,200 attend higher technical educational institutions; nearly two-thirds of the whole student body is concentrated in the law schools and in the departments of philosophy and theology of the universities. In the U.S.S.R., on January 1, 1933, there were 234,300 students in higher technical institutions training for leading positions in socialist construction. In England, in 1931, the number of students in institutions of higher education was 49,700; in the technological departments there were about 5,000 students. In the U.S.S.R. the number of students in higher educational institutions in 1932 was 492,300. In the United States, in 1927-28, there were 63,888 students in higher technical schools, in the U.S.S.R.—234,300. In the U.S.S.R. vocational education is being continually extended, while in the capitalist countries, owing to the crisis, the number of students in vocational schools is rapidly decreasing and specialists who have graduated school are doomed to unemployment.

Socialist reconstruction made it imperative that the engineering and technical forces in national economy be decisively strengthened. In the decisions of the Party and of the Government it was proposed "to increase two-fold the relative strength of the technical engineering force in heavy industry by the end of the Five-Year Plan period and at the same time to provide for the further growing requirements of industry for the coming five-year period by increasing the numbers of students and by extending the network of technicums with a view that the ratio between the number of engineers and technicians by the end of the Five-Year Plan period should be not less than 2 : 3."

These tasks were carried out. The number of specialists (including persons with practical experience) employed in industry increased three-fold, from 100,600 to 320,400; among these, the number of specialists with higher education has grown from 13,700 to 49,200, and that of specialists with secondary education—from 10,500 to 70,300. The proportion of specialists in industry has grown from 3.8 per cent of the number of workers to 6.9 per cent; the proportion of graduated specialists has increased from 0.92 per cent to 2.5 per cent. At the same time, the ratio between the number of engineers and the number of technicians has changed so that instead of it being 2 : 1.6 at the beginning of the first Five-Year Plan period it became 2 : 2.8 by the end of the period. A still higher rate of growth in the number of specialists has taken place in agriculture: here the number of qualified specialists has grown from 17,800 to 83,700.

In railway transportation the number of specialists with higher and secondary education has grown from 15,300 to 32,300 and by the end of the first Five-Year Plan period engineers comprised 0.65 per cent and technicians 1.5 per cent of the number of workers.

Compared with 1928, the number of scientific workers in 1932 increased more than two-fold and reached 32,000. There was also an increase in the number of post-graduate scholarship students. In 1929 there were 7,200 post-graduate scholarship students (including the post-graduates in higher educational and higher technical educational institutions); in 1932 the number of post-graduate scholarship students was 22,000.

The scientific technical training of the new specialists (who graduated during the years of the Five-Year Plan period) differs from that of those specialists who graduated before the Five-Year Plan period, since the new graduates had gained production experience during the time of their study by simultaneous practical work in industrial enterprises.

It is necessary to bear in mind that more than half of the specialists working at present (108,000 out of 184,000) have graduated during the years of the first Five-Year Plan period and their experience ranges from one to four years. This requires special attention to the task of systematically raising the scientific technical qualifications of the engineering and technical forces.

The social and technical revolution in agriculture necessitated the employment of a large number of specialists, and these had to be specialists satisfying the requirements of large-scale mechanized farming. At the beginning of the first Five-Year Plan period, there were 9,300 specialists with higher education and 8,500 technicians with secondary education employed in agriculture. Most of these specialists were prepared, by their training and scientific technical qualifications, for work under conditions of an extremely backward technical equipment of agriculture.

As a result of the first Five-Year Plan, 25,000 specialists with the highest qualifications (almost three times as many as there were at the beginning of the Five-Year Plan period) and about 45,000 specialists with secondary qualifications (five times as many as at the beginning) were added in agriculture.

Among these new specialists there are 25 per cent workers and 45 per cent peasants. The total number of specialists (including persons with practical experience) employed in agriculture is more than 200,000.

At the end of the first Five-Year Plan period an entirely new form of training leading forces for collective and State farms was initiated. The Communist universities, which had been training Party and Government workers primarily for the cities, have been reorganized into higher Communist agricultural colleges to prepare politically and technically trained workers for the lower links of socialized agriculture (machine and tractor stations, collective farms, State farms). Fifty-five schools of this kind were organized, with 30,000 students attending.

The training of qualified workers, such as tractor drivers, chauffeurs, brigade leaders, foremen for stock-breeding farms, has been organized on an extensive scale. During the four years, about 1.5 million such workers were trained for the State farms and more than 3 million for collective farms.

During the first Five-Year Plan period, an extensive network of special higher educational institutions and technicums was created as well as a new network of specialized higher technical educational instutions for the various branches of machine building—the Automobile Institute, Tractor Institute, Machine Tool Institute, the Institute for Chemical Machinery, the Institute for Agricultural Machinery, and others, beside hundreds of specialized technicums.

Much has been done in the way of organizing the training of forces to work on the production of special steels, in training specialists to work in the new branches of the chemical industry, on the production of synthetic rubber, synthetic ammonia, rayon, in wood distillation, in the production of mineral fertilizers, etc.

The training of specialists for the various branches of the food industry (meat packing, fisheries, public catering, canning, etc.) has been organized on an extensive scale.

In the coal mining industry the training of mining electricians and mechanics was organized to take care of the task of mechanizing the mining industry.

In the sphere of agriculture, special institutes for mechanization and electrification were organized. The training of agronomists and zootechnicians of high qualification has been reshaped with a view to preparing specialists for the various branches of agriculture (grain, cotton, flax, large horned cattle, hog raising, sheep raising, horse breeding, etc.).

In the transport institutes the training of new specialists was organized, to meet the demand which arose in connection with the reconstruction of the transport system (electrification of railways, etc.). Institutes have also been organized for specialists to work on the waterways and in automobile transport.

The first Five-Year Plan brought about decisive progress in the matter of creating new institutions for the training of specialists in the East, in the Urals, in Siberia, in the Far Eastern territory, and in the republics of national minorities.

Thus, in the republics and regions of the Ural-Kuzbas combine (Ural region, Western Siberian territory, Kazak Autonomous Soviet Socialist Republic, Bashkir Autonomous S.S.R.) there were previously 8,100 students in institutions of higher education at the beginning of the Five Year Plan period. In Bashkiria and Kazakstan there were no institutions of higher education at all. At the beginning of 1932 the number of students in the territory of the Ural-Kuzbas rose to 27,700. In Central Asia the number of students in higher general and technical educational institutions rose to 20,000 as against 3,500 in 1928.

A wide network of educational institutions was built up in new regions. In Sverdlovsk there were two higher educational institutions in 1928; in 1932 there were fifteen. In Tashkent there were two institutions of higher education; now there are fifteen. In Novosibirsk there were none in 1928; there are four higher educational institutions at present.

The enormous swing of socialist construction put up demands for more and more new qualified workers: two million new workers were taken on in industry, one and a half million in the building trades, many millions engaged in qualified labour in agriculture.

All these needs brought about a wide extension in the work of training qualified workers. Thus, the number of pupils in factory schools rose from 178,300 to 1,177,300. During the four years, the factory schools gave 450,000 qualified workers for the various branches of national economy; of these, 300,000 went into industry.

Besides factory schools, various forms of auxiliary education have been instituted. Millions of workers have attended various courses and study circles or taken correspondence courses. The mass work in the sphere of technical propaganda is drawing in ever increasing masses of workers.

These results could be achieved only through the growth of literacy and the raising of the cultural level of the broad masses.

In tsarist Russia before the war the average literacy of the population was not above 33 per cent. At the beginning of the first Five-Year Plan period it was 58.4 per cent, and by 1932 it rose to 90 per cent. The Five-Year Plan provided for the teaching of 18.2 million illiterates. Actually, over 45 million people were drawn into schools for the elimination of illiteracy. The Plan in this respect was overfulfilled by two and a half times.

The U.S.S.R. now occupies first place in the world in the number of people attending school and in the development of cultural educational institutions and organizations. The number of children and adults in various educational institutions (pre-school, schools of all types, including higher educational institutions, schools for the elimination of illiteracy) has reached 50 million, which is three times as many as in 1927-28.

Considerable success was attained in the Soviet Union during this short period of time in the matter of introducing universal elementary education, which in the leading capitalist countries had required tens of years. The introduction of universal obligatory education (for children from the ages of eight to eleven years) was on the whole completed in 1931-32. In the cities it was completed in 1930-31.

At the same time decisive progress has been made in the matter of developing universal seven-year education. The number of pupils in the three last school grades (fifth, sixth and seventh), in the autumn of 1932, was 4.298 million as against 1.216 million in 1927-28. The original plan was to provide for 1.843 million pupils in these grades in 1932-33. Thus, the complete fulfilment of the program of introducing universal seven-year education has been ensured in the cities. In the whole of the U.S.S.R. the number of children in the seven-year schools comprises 67.3 per cent of all children of the corresponding ages.

Since the end of 1932, steps have been taken to carry out the program of the Party regarding the introduction of universal obligatory technical education for all children up to the age of seventeen years. A third cycle of schools is being organized.

On the whole, the number of children receiving universal elementary education has doubled during the Five-Year Plan period, increasing from 11.2 million in 1927-28 to 23.1 million in 1932.

Great progress was made during the Five-Year Plan period in organizing the care of children of pre-school age. In 1927-28 there were 308,000 children in pre-school educational institutions; in 1932 the number was 5.232 million, which comprises 23.7 per cent of all children of from three to seven years of age.

A clear indication of the cultural and political advancement of the population is presented by the growth of the Soviet press. In tsarist Russia, in 1913, the newspaper circulation was 2.7 million. At the beginning of the Five-Year Plan period it was 8.8 million (576 newspapers) and by the end of the first Five-Year Plan period it rose to 36 million (6,500 newspapers). The yearly circulation of newspapers rose from 2 billion at the beginning of the Five-Year Plan period to 5.7 billion at the end of the period.

The number of books (separate titles) published in the first year of the Five-Year Plan period was 34,200; at the end of the period the number was 53,800. The entire book and magazine production rose from 2.1 billion printed signatures in 1928 to about 3.5 billion in 1932.

The growth of the press of the national minorities was particularly significant. Books have been published in 36 languages in 1913, in 55 languages in 1927-28, and in 90 languages in 1932. In 1928 newspapers were published in 48 languages, in 1931 in 63 languages. The proportion of books in the languages of the national minorities rose from 18.3 per cent of the whole volume of published books in 1928 to 25.2 per cent in 1931.

The period of the first Five-Year Plan was also the period of a very considerable growth of the most varied forms of cultural and educational activity, which express the general cultural advancement of the population of the U.S.S.R. The network of reading rooms in the villages grew from 21,300 to 46,000; in addition, 1,500 houses of socialist culture were built.

Thus, during the years of the first Five-Year Plan, tremendous achievements were gained in the sphere of cultural upbuilding, which considerably advanced the country in the matter of bridging the differences between the cultural level of city and countryside, between brain work and physical labour, between the various nationalities of the Soviet Union.

During these four years and three months of the first Five-Year Plan period the Soviet Union has made tremendous progress in the sphere of building up Soviet forces of leaders, directors and organizers in large-scale socialist production. The elimination of illiteracy, the enormous growth of the network of schools and institutions, for pre-school education, of clubs, theatres and other cultural institutions, the growth of the circulation of newspapers, magazines and books, the enormous growth of educational activity among the toiling masses, the development of socialist science and culture, have transformed the U.S.S.R. into a country of the most advanced culture.

GEOGRAPHIC DISTRIBUTION OF THE PRODUCTIVE FORCES

CHANGES IN THE GEOGRAPHIC DISTRIBUTION OF THE BRANCHES OF NATIONAL ECONOMY

THE socialist industrialization of the country, the problems of utilizing its natural wealth in every way and of bringing industry into proximity with the sources of raw materials, of outliving the antagonism between town and countryside and of doing away with the economic backwardness of the national minority regions made it imperative to effect a radical change in the geographic distribution of the productive forces as they had taken shape in pre-revolutionary Russia.

In pre-revolutionary Russia, the uneven territorial distribution of productive forces, inherent in capitalism, found its expression in the fact that over three-quarters of industry was concentrated in four districts (the districts of Moscow, Ivanovo, St. Petersburg and the Ukraine). The concentration of industrial development in a few districts of European Russia, coupled with the extreme economic and cultural backwardness of the outlying regions, was determined by the fact that the relation of these regions to the centre was the same as that of colony to metropolis. Siberia, Central Asia, the Caucasus, Transcaucasia were turned into raw material appendages to Central Russia; they had no industrial proletariat, or almost none, and upon most of their territory they retained the most primitive forms of economy and patriarchal-feudal relationships. An extreme unevenness was characteristic also of the geographic distribution of the productive forces within the metropolis itself.

The tremendous natural wealth of the country was studied to a negligible degree. This was due to the general economic backwardness of pre-revolutionary Russia, to the policy pursued by Russian and foreign capital of a wasteful exploitation of a small part of the deposits of minerals and of the other natural resources exclusively in those regions which were most habitable and accessible owing to transport and other facilities.

The uneven distribution of the productive forces of tsarist Russia could be traced in all branches of its economy.

The iron and steel industry was concentrated almost entirely in the South of Russia. In 1913, the plants of the Donbas and the Dnieper regions produced 74 per cent of all the pig iron, with the remaining production concentrated in small, technically backward plants working on charcoal in the Urals and in the Central Region.

The coal industry of Russia was concentrated territorially to a still larger degree. The production of coal was almost entirely concentrated in the Donbas region, which in 1913 yielded 87 per cent of all the coal produced in the country. The enormous land was thus dependent upon a single region for its coal.

Machine building, which was very feebly developed in agrarian Russia, was concentrated mainly in the central regions, in the Moscow and St. Petersburg regions and in the Ukraine. In the territories of national minorities of Russia there was no machine building industry at all.

The cotton textile industry was also grouped upon the territory of the Moscow, Ivanovo and St. Petersburg regions. The linen industry was more than 50 per cent concentrated in the Ivanovo district, though the bulk of long-fibre flax was produced in the Western Region, White Russian and other regions.

The entire sugar industry was concentrated in the Ukraine and the Central Black Earth Region.

The development of transportation in tsarist Russia corresponded to the geographic distribution of the productive forces of industry and agriculture. The main network of railways radiated out from the centre and in the main was concentrated in the European part of Russia, which had a relatively well-developed network of railways (11.3 kilometres per 1,000 square kilometres as against 0.6 kilometres per 1,000 in Siberia, Kazakstan and other outlying regions).

Some of the regions most rich in raw material resources had remained entirely undeveloped industrially: Central Asia, which had supplied cotton; Transcaucasia, where only the oil beds had been wastefully exploited—without, however, in any way affecting the economic life of the Transcaucasian nationalities; Siberia with its inexhaustible resources of coal, iron, etc.; Kazakstan and other regions.

Such a distribution of the productive forces of capitalist Russia corresponded to the level of their pre-revolutionary development and to the interests of the landowners and capitalists, who wanted the border territories to remain "in a condition of semi-savagery or of utter savagery." (Lenin)

The proletarian State, which took as its principal task the socialist industrialization of the country and the widest development of its productive forces, could not reconcile itself to such an uneven territorial distribution of the national economy. The socialist geographic distribution of the productive forces is part of the program of the building of socialism. In the period of restoration of the economy of the U.S.S.R., the Soviet Union utilized the old fixed capital and could not substantially alter the previously formed territorial distribution of the productive forces. Only during the period of the widespread reconstruction of the national economy of the Soviet Union, during the period of the gigantic new construction program based on the first Five-Year Plan, could the question of socialist territorial distribution of the productive forces of the U.S.S.R. be considered in its full scope.

The first Five-Year Plan reflected the basic teachings of Marx. Engels, Lenin and Stalin concerning the rational distribution of the productive forces in socialist economy and the elimination of the antagonism between city and countryside. A more even distribution of industry, shifting industry nearer to the sources of raw materials, the specialization of economic regions, the elimination of the economic and cultural backwardness of the regions of national minorities, the strengthening of the defensive capacity of the country—these were the main considerations that found their expression in the first Five-Year Plan.

The main lines of the socialist geographic distribution of the productive forces of the country mapped out by the Five-Year Plan were supplemented by the decisions of the Party and the Government concerning the establishment of a second coal and metallurgical base in the East, the discontinuation of further industrial building in the existing large urban centres, particularly in Moscow and in Leningrad, and concerning the specialization of agricultural regions.

> "In approving the resolution of the Central Committee of May 15, 1930, as regards the Urals, the Sixteenth Congress agrees that 'the industrialization of the country cannot in the future rest only upon the single coal and metallurgical base in the South. A vitally necessary condition for the rapid industrialization of the country is the creation in the East of a second principal coal and metallurgical centre in the U.S.S.R. by way of utilizing the very rich coal and iron ore deposits of the Urals and Siberia.'*
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> "At the same time the Congress recognizes the necessity of speeding up the development in the eastern regions (the Urals, Siberia, Kazakstan, Central Asia) of other branches of industry depending upon local sources of raw materials (non-ferrous metallurgy, textile industry, etc.)."**

These fundamental tendencies of the first Five-Year Plan, further developed and supplemented by the decision of the Sixteenth Congress of the Communist Party of the Soviet Union, signified a great shifting of industry towards the East, a higher rate of industrialization and of general economic growth for the more backward regions.

It also meant that the gigantic natural wealth, which had hitherto remained almost untouched in the vast territory of the country, has now been made available for industrial exploitation.

The inexhaustible deposits of coal in the Kuznetsk basin, Karaganda and other districts, the iron ore of the Urals and Siberia, the deposits of non-ferrous metals in Kazakstan and Central Asia which are of world importance, the immensely valuable sources of water power, the vast expanses of forest, the new oil beds, and the numerous resources of useful minerals, formed a natural basis for the movement of industry towards the East.

These natural resources, which before had been known only in their rough outlines, were discovered in greater quantities and prepared for industrial exploitation by widespread geological surveys and research work in the first Five-Year Plan period.

The gigantic construction program developed by the proletarian State in the first Five-Year Plan resulted in important changes in the geographic distribution of the productive forces of the national economy of the U.S.S.R. in all of its branches, and the determining factor in this respect constitutes the establishment in the East of the second *coal and metallurgical base.* A natural basis for the organization of the second coal-metallurgical base in the East was afforded by the coal and ore deposits of the Urals and Siberia. The ascertained geological resources of iron ore in these regions had been fixed by the beginning of 1932 at 635 million tons of potential metal. The resources of coal for industrial exploitation which have been discovered in the Urals, Western Siberia and Karaganda (Kazakstan) have been fixed at 9.5 billion tons, while the total geological resources of these regions have been fixed at 450 billion tons. These figures, which do not comprise the vast resources of coal deposits of Eastern Siberia and the Far Eastern territory or the deposits of iron ore in the Far East, Kazakstan and the Middle Volga Region, give an adequate idea of the tremendous prospects which are opened up in connection with the industrial exploitation of the natural resources of the eastern districts.

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* Decision of the Central Committee of the Communist Party of the Soviet Union, May 15, 1930.

** Decision of the Sixteenth Congress of the Communist Party of the Soviet Union on the Five-Year Plan for industry.

As a result of the construction work done during the first Five-Year Plan period in the iron and steel industry and of the simultaneous considerable increase in the output of pig iron in the plants of the first metallurgical base in the Ukraine, an essential change was achieved in the direction of a more even territorial distribution of the iron and steel industry. The share of the eastern regions in the total output of pig iron rose from 21.4 per cent in 1928 to 25 per cent in 1932.

This increase in the relative importance of the eastern districts results from the setting in operation of only the first units of the Magnitogorsk and Kuznetsk metallurgical plants and from the reconstruction of the metallurgical industry of the Urals. When the productive potentialities which have been created are mastered to the full and when the construction work now going on in the East is finally completed, the relative importance of the East in the metallurgical industry of the Soviet Union will be still further enhanced during the second Five-Year Plan period. Thus, for instance, the Magnitogorsk Plant began operation toward the end of the Five-Year Plan period with only two blast furnaces, whereas it is designed for eight blast furnaces, which are being built. The Stalinsk Plant in the Kuzbas began operation in 1932 with one of its projected four blast furnaces, three of which are still in the process of construction. The fact that the program of construction is being continued on this scale, coupled with the construction of other new metallurgical works in the East, and the completion of the reconstruction of the Ural metallurgical plants determines what are to be the further territorial changes in the distribution of the iron and steel industry.

Simultaneously with the organization and the accelerated development of the second coal and metallurgical base in the East, an extensive program of reconstruction and expansion of the metallurgical plants working on ores from deposits of secondary importance (*e.g.*, the Lipetsk, Tula, Kulebaki and other plants) has been carried out during the course of the Five-Year Plan period as well as the construction of new enterprises.

During the course of the first Five-Year Plan period, extensive prospecting work has been carried out in the new iron basin, the Kursk Magnetic Anomaly. This prospecting work gave brilliant results, having paved the way for the industrial exploitation of huge deposits of rich ore.

Of tremendous significance has been the work of geological research carried out during the period of the first Five-Year Plan in the districts of the first coal-metallurgical base—a work which has paved the way for the industrial exploitation of fresh hundreds of millions of tons of metal in the iron-ore deposits of Krivoy Rog and Kerch and which has ensured the further growth of the metallurgical industry in the South of the U.S.S.R.

In the coal industry which, as pointed out above, was concentrated exclusively in the Donbas region before the Revolution, the Soviet Union had already made great strides in the matter of its more even distribution at the beginning of the first Five-Year Plan period. In 1927, despite the large growth of the total coal production as compared with 1913, the percentage mined in the Donbas amounted to only 78 per cent as against 87 per cent in 1913. At the same time, the percentage mined in the East increased from 11.7 in 1913 to 19 in 1927-28, and during the Five-Year Plan period it grew to 25.8.

The enormous construction program carried out during the Five-Year Plan period in the coal regions of the East (Kuzbas, Karaganda) and in the Moscow coal basin, determined the increased relative importance of these regions and the more rational distribution of the coal industry over the territory of the Soviet Union.

This new geographic distribution of the coal industry was directly dictated by the territorial disposition of the country's coal resources. It is enough to say that out of the sum total of the Soviet Union's ascertained resources of coal for industrial exploitation, about 70 per cent is concentrated in the Urals and Siberia, including over 60 per cent in the Kuzbas. Such districts as Kazakstan, which possesses ascertained resources of coal for industrial exploitation amounting to billions of tons, Central Asia, the Moscow basin, the coal deposits of Trancaucasia, of the northern districts of the U.S.S.R. and of many other regions had remained almost untouched prior to the Revolution and did not attain any great significance until the Five-Year Plan period.

By the end of the Five-Year Plan period, the Soviet Union already had seven large coal-producing regions instead of the one in the Donbas. These are: Donbas, Kuzbas, Karaganda, Chelyabinsk, Kizel, Cheremkhovo and the Moscow basin. The Kuzbas region increased its output from 878,000 tons in 1913 to 2.5 million tons in 1927-28 and 7.3 million tons in 1932, *i.e.,* the output has been almost trebled during the Five-Year Plan period.

Karaganda has grown into a coal region of tremendous capacity. In 1932, it was already yielding 723,000 tons of coal, with great prospects of further development. A large increase in the output of coal is to be noted in the Far East, in the Cheremkhovo basin, in the Moscow basin, in Tkvarcheli, and in other regions.

In order to give a picture of the changes that have been effected during the Five-Year Plan period in the territorial distribution of the fuel industry, it is necessary to point out the sharp increase in the production of peat, as the most important type of local fuel, which has made it possible to organize some large electric power plants upon this base in a number of regions of the U.S.S.R. (the Moscow and Ivanovo regions, the Gorky territory, White Russia, the Urals, etc.).

Substantial changes have been made during the Five-Year Plan period in the geographic distribution of the *oil* industry. Before the Revolution it was concentrated entirely in the Baku and Grozny districts. The extraction of oil in these districts, based as it was upon widespread research work, which disclosed the presence of new oil beds, and upon the reconstruction of the industry which has been accomplished has greatly increased during the years of the Five-Year Plan period. Toward the end of the first Five-Year Plan period, oil extraction was begun in a number of new regions, which due to their rich deposits offer great prospects of industrial development (Maikop, the Urals, Sterlitamak, Georgia, Ukhta, etc.), and in the newly developed districts where oil extraction played only an insignificant part up to the beginning of the Five-Year Plan period (Emba, Turkmenistan, Sakhalin). Whereas the above-mentioned new districts had remained insignificant up to the beginning of the Five-Year Plan period, by the end of that period, their relative importance as regards the reserves of oil available for industry rose to as high as 12 per cent, while as regards the geological reserve of oil, their relative importance already amounts to 35 per cent. This gives an idea of the importance of the research work which has been accomplished and of the territorial changes that have taken place during the Five-Year Plan period in the oil industry.

Together with the organization of oil extraction in a number of new regions, a network of oil pipe lines has been built: Baku-Batum, Grozny-Tuapse, the pipe line for oil products from Armavir to Trudovaya, as well as a number of oil-refining plants in the main regions requiring oil products. These measures have introduced radical changes in the territorial distribution of the oil industry.

The geographic distribution of the *electric power* industry in the course of the first Five-Year Plan period has been one of the principal factors in the new distribution of the productive forces of the country, assuring as it does both a radical technical reconstruction of the old industrial regions and the creation of a power supply base for the industrial development of new regions.

As a result of the Five-Year Plan period, the total rated capacity of all the electric power stations of the U.S.S.R. has increased 2.4 times. The number of large local electric power stations increased from 18 in 1928 to 43 at the end of 1932.

As a result of this construction and the reconstruction of the old electric power stations, the aggregate capacity of the power stations of the Leningrad region rose from 284,100 kw. in 1928 to 410,300 kw. in 1932. The stations of the Moscow region increased their capacity from 387,500 kw. to 665,300 kw. during the same period. The aggregate capacity of the power stations of all the regions comprising the old industrial districts, *i.e.*, the Moscow, Leningrad, Ivanovo regions and the Gorky territory, rose from 819,800 kw. to 1,555,100 kw.

In the Urals, the increase in the capacity of the electric power stations during the first Five-Year Plan period was particularly rapid, rising from 131,100 kw. in 1928 to 434,000 kw. in 1932.

The problem of supplying the Donbas and other industrial districts of the Ukraine with electric power has been solved by an increase in the capacity of the electric power stations in the Ukraine from 465,200 kw. in 1928 to 1,428,900 kw. in 1932.

The capacity of the stations of Transcaucasia grew from 141,400 kw. to 220,500 kw.

Among the power stations which have been newly erected and radically reconstructed during the Five-Year Plan period, the following occupy an especially prominent place: the Kashira Station, which at the end of the Five-Year Plan period attained a capacity of 186,000 kw.; the Shatura Station with 136,000 kw.; the First Moscow Station (Moges I) with 107,000 kw.; the Krassny Oktyabr Station with 111,000 kw.; the Shterovka Station with 157,000 kw.; the Zuevka Station with 150,000 kw.; the Gorky Station with 158,000 kw.; the Chelyabinsk Station with 100,000 kw.; the Krassnaya Zvezda Station at Baku with 109,000 kw.; and the greatest hydro-electric station in the world, the Dnieper Hydro-electric Station, named after Lenin, with a capacity at the end of the Five-Year Plan period (when it was set in operation) of 310,000 kw. and with a projected capacity of 558,000 kw.

The development of *machine building* in the U.S.S.R. during the first Five-Year Plan period was accomplished through the high rate of growth of the old machine building districts, which served as the principal bases for the industrialization of the backward districts, and through the simultaneous extensive development of machine building in new districts. The creation of a second coal and metallurgical base predetermined a shifting of industry, above all of heavy industry and transport machine building, towards the East.

In the eastern regions of the U.S.S.R. the following main machine building plants have been constructed: the Sverdlovsk Plant for metallurgical equipment, the Chelyabinsk Tractor Plant, the Chelyabinsk Abrasive Plant, the Irkutsk Plant for mining equipment, the Tashkent Plant for agricultural machinery, the Verkhne-Saldinsk Plant for iron constructions, and the departments for iron constructions at Kuznetskstroy and Magnitostroy. A number of plants have been reconstructed: the Zlatoust Tool Making Plant, the Ilyich Metal Working Plant in Tashkent, the Ust-Katava Car Building Plant, the Chelyabinsk Agricultural Machinery Plant, the Perm Plant for the manufacture of separators, and the Far Eastern works. Construction is under way on the Komsomol Shipbuilding Wharf in the Far East, on the Taguil Car Building Plant, the Siberian Textile Equipment Plant, the Sverdlovsk Plant for the production of chemical apparatus and the plant for the production of electrical apparatus, the carburettor plant in the Middle Volga region. Construction has been started on the Kuznetsk Locomotive Building Plant, the Orsk Diesel and Steam Locomotive Building Plant, the motor building plant in Bashkiria, and others.

This list of the principal machine building units, though it does not by any means exhaust the total program of new construction work which has been accomplished, shows quite clearly that machine building has been distributed more evenly throughout the country—in the Volga regions, the Urals, Western Siberia and the outlying regions of the national minorities in the U.S.S.R. —thus creating a base for the further industrialization of those regions.

In the field of chemical industry, which was formerly one of the most backward branches of industry, the Soviet Union was confronted at the beginning of the Five-Year Plan period with the task of establishing a new industry of heavy chemicals, and in this case, therefore, the question is not of the achievements in the changed geographic distribution of the industry but of the initial distribution of a new chemical industry. The solution of this problem demanded that research work on chemical raw materials be developed at top speed, as a result of which the Five-Year Plan period witnessed the discovery of the gigantic reserves of apatite deposits at Khibiny, totalling billions of tons, of huge phosphorite beds in Kazakstan, in the Middle Volga region, in the central region of the European part of the U.S.S.R. and in the Ukraine, of potash deposits of world importance in the Urals, of deposits of sulphur in Central Asia and the Middle Volga region, and of many other rich sources of chemical raw materials. During the first Five-Year Plan period a number of sulphuric acid plants have been created (the Polevo, the Krassny Ural and others), besides a number of nitrate and fertilizer plants (Berezniki, Bobriki, Chernorechinsk, Konstantinovsk, Aktyubinsk and others); an industry of phosphate fertilizers has been created in the apatite mine district of the Kola Peninsula as well as in the phosphorite districts of the Vyatka territory and of Kazakstan; the extraction of potassium salts has been developed in the Urals, etc.

In connection with the development of a steel and iron industry using mineral fuel in the Urals and in Western Siberia, a powerful *coke and chemical industry* has sprung up in these districts (Stalinsk plant, Kemerovo, Kizel, Magnitogorsk).

These main works of construction in the chemical industry alone give a sufficiently vivid idea of the way in which the new districts of the Soviet Union, not previously industrialized, have been opened up and of how the natural resources of the most distant and in the past neglected regions, like Khibiny, located within the Polar Circle, Berezniki, etc., are being drawn into the orbit of socialist construction.

The development of industrial construction in the East and in the territories of national minorities of the Soviet Union has not been confined to heavy industry. During the first Five-Year Plan period, the eastern districts have been covered with a dense network of enterprises in the *light and food industries.* A number of *cotton textile, leather and shoe factories* have been built up in these regions upon their own bases of raw materials and power supply. A widespread system of food factories has been established including sugar plants, canning factories, vegetable oil plants, confectionery factories, meat packing combines and refrigerating plants. Among the enterprises of light industry, the following deserve especial mention on account of their importance: a number of newly-built silk mills in the republics of Central Asia and Transcaucasia; the cotton mills of Fergana and Askhabad; the large leather factory in the city of Frunze; two large-scale cotton combines in Tashkent and in Barnaul, under construction at the present time.

Outstanding among the enterprises of the food industry is the system of canning factories in the principal producing sections of the country and in such distant regions as Kamchatka; a number of sugar plants in Kirghizia, Kazakstan, Western Siberia and the Far East, now in process of construction; and the building of the meat-packing combines in Semipalatinsk, Orsk and Verkhne-Udinsk.

The geographic distribution of *agriculture* in tsarist Russia was characterized by the antithesis between producing and consuming regions and by the absence of systematic specialization of agricultural districts, which was brought about by the universal small-scale commodity production of peasant farming.

The socialist reconstruction of agriculture, the creation of the largest-scale agriculture in the world, and the solution in the main of the grain problem, have made it possible to achieve great changes in the territorial distribution of this branch of national economy in the direction of the most effective utilization of the climatic and soil conditions of the various regions of the Soviet Union.

The share of the new regions in the area sown with *technical crops* grew from 48 per cent in 1928 to 57 per cent in 1932, while at the same time the area under technical crops in the old regions was also extended.

The creation of the country's own base of raw materials for the cotton textile industry has been effected by way of extending the main *cotton bases* of the U.S.S.R. and simultaneously developing new cotton districts; the share of these new districts (Transcaucasia, Ukraine, Northern Caucasus, Crimea, Lower Volga) in the total area under cotton rose from 0.2 per cent in 1928 to 19.7 per cent in 1932.

Besides consolidating the *flax base* in the old industrial sections, flax cultivation has also been shifted eastward. *Sugar beet* growing has also been introduced in new districts, as a result of which the area under sugar beet in these districts now represents a greater percentage of the total area under beet cultivation in the U.S.S.R.

As regards *grain crops,* the consolidation of the grain bases in the Ukraine, Volga regions and Northern Caucasus has been accompanied, in the course of the Five-Year Plan period, by a shifting of wheat growing towards the East—to Kazakstan and Western Siberia.

In the sphere of agricultural development, the central industrial districts are ceasing to be districts of the so-called consuming zone, wholly dependent on the delivery of agricultural products from outside their borders, and are becoming districts of intensive and specialized agriculture with emphasis on the development of technical and fodder crops, of stock-breeding and dairy farming and the widespread development of suburban truck farms.

This new geographic distribution of agriculture, which makes for specialization as between the various agricultural districts, has ensured an extension of the sown area by additional tens of millions of hectares on the basis of collective and State farming and has made it possible to achieve great and effective results in the utilization of the most valuable stretches of land and of the climatic conditions prevailing in the South and the sub-tropical zone of the Soviet Union by extending the sowings of the most valuable technical crops.

The development of *transport construction* proceeded in accordance with those territorial changes which took place in the leading branches of national economy towards the end of the Five-Year Plan period. Of the 14,000 kilometres of new railways started during the Five-Year Plan period and the 6,500 completed and put in operation toward the end of that period, about 80 per cent fall to the eastern districts. The following new lines have been opened: Borovoye-Akmolinsk-Karaganda, Leninsk-Novosibirsk, Kartaly-Magnitnaya, Kurgan-Sverdlovsk and others. During the Five-Year Plan, the Turksib railway, with its great length of track, was built, thus establishing a new inter-regional means of communication between Central Asia and Siberia. This trunk-line has created vast possibilities for the development of the productive forces of districts that were formerly isolated from the industrial centres.

During the first Five-Year Plan period, several new *sea routes* have been opened up. Regular traffic has been established over the Kara Sea and a start has been made in opening up the entire Northern Sea route, from the White Sea to the Bering Straits, for transport. One of the largest canals in Europe, the White Sea-Baltic Canal, has been built, thus opening the shortest navigation route between Leningrad and the Northern Sea. A number of *river routes* have also been opened for navigation, along the whole length of Siberian rivers, the Yenissei, the Ob, the Lena, etc. The opening up of sea and river routes in the Far North presents great possibilities for the development of the productive forces of the nationalities of the North, which are especially backward in economic and cultural respects.

The opening up of new routes of communication, coupled with the transport works which are still under construction, has created the necessary conditions for the further more even distribution of productive forces over the immense territory of the Soviet Union.

All the above-mentioned territorial changes, effected during the first Five-Year Plan period, in the geographic distribution of the various branches of national economy, show a great shifting of industry towards the East, a process of bringing the centres of industrial production close to the sources of raw materials and power supply, and an enormous acceleration in the industrial development of the formerly backward agrarian regions of the Soviet Union. The results achieved in bringing industry nearer to the sources of raw materials and power supply, denoting as they do the solution of the disproportion created in the past in the development of national economy in different sections of the country, and the elimination of the profound difference between the relatively high level of industrial development of a small group of central and southern districts on the one hand and the exceptional backwardness of the economic and cultural development of the rest of the country on the other, have at the same time assured the enormous rise of the effectiveness, from the standpoint of national economy, of the funds invested in construction and the expenditure of social labour. The shifting of industry towards the East, based upon the creation of a second coal and iron base, the new and more even distribution of industry, and, coupled with this, the establshment of new proletarian bases, have served as a powerful stimulus to speed-up the general economic development of the *formerly backward districts.* As a result of the socialist reconstruction of agriculture in the eastern regions and the widespread development of State and collective farms, districts of extensive and unstable agriculture are being changed into reliable raw material and foodstuff bases of the Soviet Union.

The establishment of new industrial centres in the East, requiring as it did the development of an enormous program of new construction, would have been impossible without completely mastering, strengthening and further developing the productive capacities of the old industrial districts in the Centre and South of the U.S.S.R. In the old industrial districts of the central and southern regions, the industries inherited from tsarist Russia have been reconstructed, and reinforced by the construction of large new plants, and, thus strengthened, these regions have served as the base for the technical re-equipment of the national economy of the country as a whole. This new division of labour between the various regions, the material and technical aid given to the backward regions in their industrial development—the system which has supplanted the former relationships of colonial exploitation which prevailed in tsarist Russia—all this demanded specialization on the part of the old industrial centres, particularly the central districts, in the matter of establishing and developing the technically complicated skilled branches of heavy industry—machine building, chemical and electrical industries—and also the most essential and technically complicated branches of the light industry and food industry. The great advance effected in the development of the industrial power of the old districts has been consolidated during the Five-Year Plan period by these districts mastering their own internal resources of raw materials and power supply, thereby freeing themselves to a very large degree from dependence upon long haulage of fuel and raw material.

Thus, the movement of industry towards the East, the creation of new industrial centres, stipulating as it does a more even distribution of industry and getting better returns out of the natural resources of the country, demanded a further strengthening of the industrial power of the old industrial districts, a high rate in their economic development and the transference of their economic life to a superior technical basis.

Such are the main results of the first Five-Year Plan period in the sphere of geographic distribution of the productive forces. By creating a new and higher productive force of social labour through the consistent application of the socialist principles of the geographic distribution of productive forces in construction during the first Five-Year Plan period, the foundations of the proletarian dictatorship have been extended and strengthened and the main prerequisites have been created for the further socialist transformation of the whole economy of the Soviet Union.

THE ECONOMIC AND CULTURAL RISE OF THE NATIONAL MINORITY REPUBLICS AND REGIONS OF THE U.S.S.R.

The industrial and agricultural development of the entire group of districts which constitutes the main economic centre of the Soviet Union has been accompanied by a still more rapid economic and cultural growth of the formerly backward *republics and regions* of the national minorities. The greater tempo of economic and cultural development attained by these republics and regions has reflected with particular clearness the consistent policy pursued by the proletarian State with respect to the different nationalities of the country. By virtue of this policy of the Soviet State on the national question the former colonies of tsarist Russia have been turned into those regions of the Soviet Union which are rapidly becoming industrialized and which are richest in their natural resources. Whereas in the old industrial districts the volume of industrial production has been doubled in the course of the Five-Year Plan period, the volume of industrial production in the republics and regions of the national minorities has increased more than three and a half times during the same period. Enormous progress has been made in the strengthening and reconstruction of agriculture in the republics and regions of the national minorities, in the field of transport construction and in the development of cultural improvements.

In the division of labour between the various districts of the Soviet Union, *Central Asia* was called upon to free the U.S.S.R. from dependence upon imported cotton. Side by side with the extension and strengthening of cotton-growing on the basis of collectivization, a network of textile enterprises has been developed in Central Asia during the course of the Five-Year Plan period, and construction has been started on a number of enterprises of heavy industry.

In the course of the Five-Year Plan period, the Turksib railway was constructed, thus affording new outlets for the production of the Central Asiatic republics.

Among the republics of the Soviet Union, the *Uzbek S.S.R.* was assigned the role of the leading cotton region of the country. During the first Five-Year Plan period, the area under cotton was extended and cotton-growing was reinforced, on the basis of collectivization, by the introduction of new technique and by the development of an enormous program of irrigation projects, all of which has enhanced the importance of the Uzbek S.S.R. as the main cotton base of the Soviet Union.

Along with these tremendous achievements, the rapid development of industry appeared as a new factor in the economic life of the Uzbek Republic. Through the construction of a large-scale agricultural machinery plant in Tashkent and of a number of mechanical and repair shops in the adjacent districts, and through the building of the Ilyich Metal Working Plant with a large department for iron constructions, the Republic has acquired its own reliable base for the technical equipment of its economy during the process of reconstruction.

Of great importance is the development of the construction during the last years of the Five-Year Plan period, of the powerful Chirchikskaya Electric Power Station, with its combine of nitrate plants for fertilizing the cotton fields, and the development of the mining industry and non-ferrous metallurgy. During the Five-Year Plan period, the rich copper deposits at Almalyk were prospected and preliminary work completed for their exploitation.

The rapid development of the construction of the great textile combine in Tashkent and the opening of a number of other textile enterprises such as the Fergana Cotton Mill, the silk and cotton-wool mills, etc., coupled with the construction of several enterprises in the food industry, has for the first time in the history of Uzbekistan created a base for the utilization of the vast wealth of its natural resources by working them on the spot.

The *Turkoman S.S.R.* was given the task of radically reorganizing its agriculture by extending the cultivation of cotton and clearing its valuable land of grain crops. During the Five-Year Plan period, this task has been fulfilled on the basis of a broad development of collectivization, large irrigation works and the organization of a network of machine and tractor stations. At the same time, the Turkoman S.S.R., which possesses deposits of sulphur, mirabilite and other natural resources of world importance, was also called upon to carry out a number of mighty tasks in the sphere of industry.

During the Five-Year Plan period, a large-scale sulphur plant has been built in the Kara-Kum desert; preparations have been made for the exploitation of the sulphur deposits of the Gaurdak district, which are of world importance; the extraction of mirabilite in the Kara-Bugaz district has been begun; and the oil industry is being developed. Meanwhile, textile, silk, and cotton-wool mills, food enterprises, engineering works, etc., have been constructed to work on local raw materials.

The economic reconstruction of the *Tadjik S.S.R.* was accompanied by an extensive program of road building, which is of particular importance under the conditions existing in this

Republic. Like other republics of Central Asia, the Tadjik Republic was confronted with the task of mastering the production of cotton, and in this respect great strides have been made in the course of the first Five-Year Plan period. The Tadjik Republic has now become the main region for the growing of Egyptian cotton. Construction was started on a great irrigation scheme, the Vakhsh system, which is now nearing completion, and this will provide a firm base for cotton-growing in the Republic. A silk mill, a large leather factory, an ether-oil factory and others have been constructed.

Geological prospecting and research carried out in the course of the Five-Year Plan period have disclosed the exceptional richness of ore and mineral deposits in the Tadjik Republic, particularly non-ferrous metals and rare elements.

The *Kirghiz Autonomous Republic* has made great strides in the reconstruction of its economy as a result of the Five-Year Plan. The area under cultivation has been extended from 503,000 hectares in 1928 to 1,008,000 in 1932, with an increase in the area of technical crops from 57,000 hectares in 1928 to 181,000 hectares in 1932. The industrial development of Kirghizia has assumed very considerable dimensions. By the end of the first Five-Year Plan period, the Kirghiz Autonomous Republic had become the principal region supplying Central Asia with coal, and its coal output exceeded 700,000 tons in 1932. Sugar beet factories, a meat packing plant and a number of textile factories have been constructed and set in operation. Prospecting work has disclosed the presence of deposits of mercury, antimony and other valuable minerals which afford Kirghizia great possibilities in the sphere of mining.

Before the Revolution, *Transcaucasia,* despite the presence of a large oil centre in Baku, was a backward agricultural district. The oil industry was not in any way connected with, nor did it stimulate, the general economic development of Transcaucasia, and Azerbaidjan itself, upon whose territory the oil fields were exploited, was "a country of the most backward patriarchal and feudal relationships." (Stalin.)

During the Five-Year Plan period, the Transcaucasian oil industry was fundamentally reconstructed on the basis of modern technique, as a result of which the Five-Year Plan of the oil industry was fulfilled in two and a half years; a powerful system of oil refineries was organized, both on the oil fields themselves and at sea ports, which were connected with oil fields by pipe lines; and new oil fields were opened up in Georgia. Enormous progress was made in the utilization of the mineral wealth of Transcaucasia: the coal supplies of Tkvarcheli began to be mined; coal mining increased considerably at Tkvibulli, the non-ferrous metal plants of Allaverdi and Zangezur were completely reconstructed and greatly expanded; the extraction of manganese at Chiaturi was developed on a broad scale and a powerful ferromanganese plant was built; a number of ore plants and factories for the production of building materials were constructed, the most outstanding of these being a great cement mill in Armenia; preparations were made to begin mining the Dashkesan iron ore deposits, etc. This advance represented by the increased exploitation of the natural resources of Transcaucasia was consolidated by the development of the country's own machine building industry (the reconstruction of the oil equipment plants, notably the great Lieutenant Schmidt Plant, the construction of the Tiflis Machine Building Plant, etc.). The light and food industries were also developed to a high degree. The works constructed in this group include: cotton mills at Leninakan and Ganja, the biggest silk spinning combine in the world at Nukha, and a whole series of tea and tobacco factories, while a sugar refinery and meat combine in Armenia, a meat packing combine in Baku and a number of other factories are ready to be set in operation.

The basis of this rapid industrial growth of the Transcaucasian republics was the creation of a great new power supply system of hydro-electric stations, prominent among these being the Transcaucasian State Electric Power Station, the Dzora Hydro-electric Station, the Kazakir and Rion Power Stations, which are to be set in operation in 1933, and a number of other smaller power houses.

The development of agriculture in Transcaucasia has been marked by specialization on sub-tropical crops, the cultivation of which makes it possible to utilize the unusually favourable soil and climatic conditions of the Transcaucasian republics. Such branches of agriculture as tobacco, the production of new technical crops, the extensive development of tea plantations, lemon and tangerine plantations, and other forms of orchards were developed on a large scale during the Five-Year Plan period.

Another very important result of the Five-Year Plan has been the creation of a cotton base in Azerbaidjan and to some extent also in Georgia and Armenia.

Very great progress has been made in the economic development of the *autonomous regions and republics of the national minorities of the R.S.F.S.R.*, which were once backward territories.

The *Kazak Autonomous Republic* has made especially great progress as a result of the first Five-Year Plan period. This Republic has become during the first Five-Year Plan period one of the principal bases of non-ferrous metallurgy in the Soviet Union. Some powerful non-ferrous metallurgical plants have been completed or are being built—the Jezkazgan Copper Plant, the Kazakstan Polymetal Plant at Chimkent, and the Rider Combine, while construction has been begun on the great copper works near Lake Balkhash. Towards the end of the first Five-Year Plan period, exploitation of the mighty coal basin in the Karaganda district was begun on a large scale. Its coal resources make this district the third coal base of the Soviet Union.

In the sphere of chemical industry in the Kazak Republic, construction work was developed, during the first Five-Year Plan period, on the large Aktyubinsk chemical works, which will provide fertilizers for the cotton fields of Kazakstan and Central Asia. Simultaneously with the development of heavy industry, the construction of enterprises in the light and food industries are also being developed; a vegetable and fruit canning combine and a large wool-washing plant are being built; while the huge meat-packing combine at Semipalatinsk and other projects are in the process of construction.

The extension of the cultivated area from 3.75 million hectares in 1928 to 5.6 million hectares in 1932, with an increase in the share of technical crops and particularly of crops that are new to Kazakstan (sugar beet, new bark-fibre plants, rubber-bearing plants); the organization of large livestock-breeding and grain farms, collectivization and the introduction of modern machine technique, have wrought profound and revolutionary changes in the agriculture of the Republic.

The construction of an automobile works in the *Bashkir Autonomous Republic,* the erection of a timber combine at Chernikovka, the building of the Ufa Central Electric Power Station and of a number of other plants, coupled with the radical reconstruction of the old plants (the metallurgical plant of Beloretsk, the copper combine of Baimak, etc.) serve as an indication of the great strides which have been made in the industrialization of what was formerly one of the most backward national minority republics.

The discovery of tremendous oil reserves in Bashkiria during the first Five-Year Plan period—at Sterlitamak, and the preparations made to exploit them, are of great importance. The prospects for the extensive exploitation of these oil reserves and of the Komarovo-Zigazinsk deposits of iron ore, together with the construction works already carried out in industry, indicate the further industrial development of Bashkiria.

The progress which has been made in agriculture is reflected in the extension of the cultivated area, the organization of grain and livestock-breeding State farms and of a system of machine and tractor stations.

The tremendous progress achieved by the *Tartar Autonomous Republic* during the first Five-Year Plan period both in the field of industrial construction and in that of agriculture have placed it in line with the foremost national minority republics of the R.S.F.S.R. in the work of socialist construction.

The development of the machine building industry, notably ship-building, and of the production of equipment for the soap industry, for the manufacture of typewriters, etc., the starting of construction on large-scale aeroplane and car building plants, the extensive development of the chemical industry, and the construction of timber working plants, are features which characterize the Tartar Republic as a region of ever-growing industrial importance.

During the first Five-Year Plan period, the Tartar Republic developed a large fur industry of all-Union importance, as well as a number of other branches of light industry.

At the same time, agriculture was subjected to an extensive process of reconstruction. The cultivated area was enlarged by 16 per cent, the area under wheat increasing two and a half times and that under beans three times. The socialist sector represents 74 per cent of the total cultivated area of the republic. The Tartar Republic has been covered by a network of machine and tractor stations, which were serving 40 per cent of the total cultivated area by the end of the first Five-Year Plan period.

The smaller national units have likewise been caught up and swept along in the general economic and cultural advance of the national minority regions of the Union. Thus, in the republic of the *Volga Germans* the first Five-Year Plan period has seen the building of a number of new plants (bone working mills, brickyards, a canning factory, etc.); the construction of engines has been organized; the cultivated area has increased by 20 per cent, while practically all the farms have been collectivized; 31 State farms, 38 machine and tractor stations, 600 large collective dairy farms, etc., have been organized.

The *Kalmuck Autonomous Region,* in which natural conditions are most unfavourable, which has an arid climate, has a salt soil and in which there was a glaring decline in population under the tsarist regime, achieved tremendous progress during the years of the first Five-Year Plan period. The cultivated area increased from 68,000 hectares in 1928 to 95,000 hectares in 1932, 70 per cent of the farms being collectivized; the fisheries have been provided with a new technical base and a great fish cannery is being erected in Lagan; the roads have been improved; telegraph and telephone communications have been established. The material standard of living of the population has considerably improved; the measures which have been taken in the field of health and prophylactic aid have brought about a steady increase in population instead of the former decline.

The construction of a number of industrial plants in the *Mordva Autonomous Region* (five hemp mills for the primary treatment of fibre, a poultry farm, a tannery, a canning plant in Saransk, a big cottonine mill and a number of others), coupled with the socialization and consolidation of agriculture, led to great economic progress as a result of the first Five-Year Plan in this national region, which was particularly backward before the Revolution.

In the *Mari Autonomous Region,* which possesses extensive reserves of timber, a large number of woodworking plants and saw mills have been erected, of which the Lopatino Combine is the most outstanding. In the *Chuvash Region,* besides the development of the timber industry, the exploitation of the phosphorous deposits has been organized.

In the *Udmurt Autonomous Region* the metal working industry was considerably expanded and reconstructed during the years of the first Five-Year Plan period by the construction of the Izhevsk Steam Power Station. The Izhevsk machine building works has been reconstructed and a number of other enterprises have been constructed.

In the *Buryat-Mongolian Autonomous Republic*, agriculture has been reorganized and the cultivated areas increased by 36 per cent; local industry has been thoroughly reconstructed, notably the engineering and foundry plant and the leather and canning factories. At the end of the first Five-Year Plan period, construction was begun on a great locomotive and car repair plant in Verkhne-Udinsk. A municipal power house was also built and set in operation there. A new saw mill has been built and a great meat packing combine and glass factories are in process of construction.

Notable progress has been made in reorganizing the economic life of the nationalities inhabiting the *Far North* of the Union and which were formerly among the most oppressed peoples of the country. National regions have been organized in the Far North and the industrial economy has been reconstructed. Many river routes (the Yenissei, Ob, Indigirka, Kolyma and other rivers) have been opened up and are now serving as the principal means of transportation in these regions during the summer. Besides this, a large-scale industry has been created in the Far North; this includes the great mining and chemical combine at Khibiny; the Igarka timber and woodworking combine on the Yenissei river, lying within the Arctic Circle; the oil and coal industry in Sakhalin; the canning industry in Kamchatka; gold mining in Yakutia and in the national minority regions of the Far Eastern territory. The opening up of the great northern sea route creates new possibilities for the economic and cultural advance of the peoples of the North.

The *Yakut Autonomous Republic* offers an example of the cultural and economic development of the northern regions. In addition to the growth of the gold mining industry, this republic set about creating its own food base during the course of the Five-Year Plan period, and the cultivated area increased from 26,000 hectares in 1928 to 70,000 hectares in 1932. Road-making has been conducted on a large scale; the Amur-Yakutsk grand trunk road has been constructed, an air line linking up Irkutsk with Yakutsk has been equipped and a number of industrial plants have been built.

Enormous progress in economic construction has been achieved by the other republics and regions of the Soviet Union as well, such as Karelia, the Komi region, the national minority regions and republics of the *Northern Caucasus, Kara-Kalpakia, Oiratia, Khakasia,* the highlands of *Shoria,* etc.

The achievements in the economic development of the different national minority republics and regions of the U.S.S.R., described above, strikingly illustrate the practical results of the *Leninist policy on the national question,* which has been consistently pursued by the proletarian State.

The growth of industry and the reconstruction of agriculture in these republics and regions serve as a powerful base for their speedy cultural development. From backward, oppressed and almost entirely illiterate nationalities, they have developed, with the assistance of the proletarian State, into conscious builders of a socialist society.

At the end of the Five-Year Plan period, the task of introducing *universal elementary education* has been almost completely carried out in the national minority republics and regions no less than in the other sections of the union. In Central Asia, the number of pupils attending elementary schools in the Uzbek Republic has increased 4.2 times as compared with 1927-28; in Turkmenistan—13.7 times; and in Tadjikistan—8 times. An equally tremendous growth in the number of children of local nationalities receiving elementary education may be observed in all the other national minority republics.

The percentage of children between the ages of eight and eleven attending elementary schools throughout the U.S.S.R. as a whole had risen from 55.7 to 97 by the end of the Five-Year Plan period, and this enormous achievement found its most striking form in the development of schools and the advance of elementary education in the national minority republics and regions, which were distinguished by their complete lack of any kind of mass education in pre-revolutionary days.

Much progress has been made in arranging for teaching in the children's mother tongue in all schools—a task which was begun in the very first years after the October Revolution. Teaching in mass schools is now carried on in more than seventy languages. During the first Five-Year Plan period, about seventy nationalities adopted the *Latin alphabet* instead of the highly complex Arabian and other scripts. This has served as a powerful stimulus to the cultural growth of these nationalities and the extensive development of literacy and universal education. These nationalities include the Abkhazians, Adyghians, Tyurks, Assyrians, Bashkirs, Buryats, Ingushes, Kazaks, Kalmucks, Kabardinians, Tartars, Kurds, Komi (Ziryans), Lezgins, Mongols, Ossetinians, Samoyeds, Lopari, Tadjiks, Tunguses, Turkomen, Eskimoes, Yakuts, etc.

As a result of the first Five-Year Plan, a number of national minority regions such as Adyghia, Circassia, Northern Ossetinia, the Udmurt Autonomous Region, the Komi Region, etc., introduced universal elementary education and almost completely *liquidated illiteracy* among adults. Other national minority republics which were particularly backward in pre-revolutionary days have also raised their standard of literacy during the Five-Year Plan period, *e.g.*, Tadjikistan—from 4 per cent at the beginning of the Five-Year Plan to 52 per cent at the end of the Plan; Turkmenistan—from 13.5 per cent to 61 per cent; Uzbekistan—from 12 per cent to 72 per cent; and Transcaucasia—from 36 per cent to 86 per cent.

Side by side with this extensive development of elementary education and growth of literacy, another tremendous achievement has been the organization of a great network of *pre-school children's institutions* which release the women of the minority republics from the yoke of domestic drudgery. While the percentage of children between three and seven years of age attending pre-school institutions increased from 2.3 to 24 per cent in the Union as a whole, in such republics as Uzbekistan the increase was from 0.8 per cent to 23.9 per cent, in Turkmenistan from 2.3 per cent to 32.7 per cent, etc.

Tremendous progress has been made during the Five-Year Plan in the development of *health protection measures* in the national minority republics and regions of the Soviet Union. In many regions, which formerly had no satisfactory medical service to speak of, where sorcerers and shamans reigned supreme, where numerous epidemic and social diseases were extremely prevalent owing to the unusually low material and cultural standard of living, an extensive network of medical and prophylactic institutions has been created together with a widespread system of up-to-date medical stations.

In the republics of Central Asia, Uzbekistan, Tadjikistan, Turkmenistan, Kirghizia and Kara-Kalpakia, the number of hospital beds went up from 5,953 in 1928 to 13,858 in 1932. In Kazakstan the increase was from 3,350 in 1928 to 8,303 in

1932. In six national minority autonomous republics, Yakutia, Buryat-Mongolia, Bashkiria, the Tartar Republic, Chuvashia and Daghestan, the number of hospital beds went up from 9,891 in 1928 to 13,412 in 1932. Particularly striking has been the spread of the hospital system in rural localities. Thus, in the Uzbek Republic the number of hospital beds in rural localities was trebled during the Five-Year Plan period; in Tadjikistan the increase was five-fold, in Turkmenistan 3.5 times, in Kazakstan more than 3 times, in Transcaucasia 3.3 times, etc. Coupled with the general rise of the material and cultural standards of living of the working population in the national minority republics and regions, this growth of the medical service has brought about a notable decrease in the death rate and sickness.

Highly instructive are the results of the development of children's institutions in the national minority republics and regions. Thus, the number of permanent places in *nurseries* in the republics of Central Asia, in Kazakstan and Transcaucasia increased from 2,500 at the beginning of the Five-Year Plan period to 58,000 in 1932. In the six national autonomous republics named above, the number of permanent places in nurseries increased from 1,600 to 19,000.

The cultural and political advance of the national minority republics and regions is strikingly reflected also in the growth of the *local language press.* While the general book production was growing at a tremendous rate, the proportion of books (number of titles) published in the languages of national minorities went up from 25.9 per cent in 1928 to 37.4 per cent in 1931.

Many nationalities did not receive alphabets until after the October Revolution. The introduction of the Latinized alphabet has given a powerful stimulus to the development of national culture, particularly the national press. In 1927, books were printed in fifty-five languages in the U.S.S.R., whereas in 1932 the number of languages was ninety. The growth in the number of books published in languages of the national minorities in the U.S.S.R. is indicated by the fact that while the total number of books in these languages (other than Russian) published in 1913 amounted to 7 million copies, in 1928 this figure increased to 45.7 million and in 1931 to 195.4 million copies.

In the aggregate newspaper production of the U.S.S.R., where circulation increased from 8 million copies in 1928 to 34.8 million copies in 1931, the percentage of newspapers published in non-

Russian languages increased from 10.5 in 1928 to 26.2 in 1931; newspapers in the U.S.S.R. are published in eighty-eight languages.

These figures indicate the enormous growth of the national press, which represents one of the most potent instruments for the cultural and political development of the national minorities of the U.S.S.R. and constitutes a criterion of the successes achieved in this field during the Five-Year Plan period.

The rapid economic development of the national minority republics, territories and regions during the first Five-Year Plan period was accompanied by the creation in these regions of national *educational institutions,* which are training an industrial and technical intelligentsia from among the local nationalities themselves.

In 1928, only two of the eleven autonomous republics of the R.S.F.S.R. (the Tartar and the Crimean) had higher educational institutions. In 1932 every autonomous republic with the exception of Yakutia had higher educational institutions.

Of the fourteen autonomous regions only Adyghia and Ingushetia had higher educational institutions in 1928. At the present time, higher educational institutions have been established in the autonomous regions of Komi, Udmurt, Mari, Mordva and Circassia. Altogether, the autonomous republics and regions of the R.S.F.S.R. had ten higher educational institutions in 1928, as against fifty at the present time.

In Transcaucasia there are thirty-five higher educational institutions at present as compared with ten in 1928. In Uzbekistan twenty-two higher educational institutions have been created in place of the former three. Turkmenistan now has four higher educational institutions instead of one. Finally, Tadjikistan, which did not have a single higher educational institution at the beginning of the Five-Year Plan period, now has three higher educational institutions.

Moreover, at the higher educational institutions situated in the old cultural centres outside the territories of the various national minority republics and autonomous regions, preference is shown in accepting students from the national minorities, which system has created additional facilities for training qualified cadres from among these nationalities.

The growth of secondary schools among the national minorities has been no less rapid. In 1928 the autonomous republics and regions of the R.S.F.S.R. had 107 technicums with 17,900 pupils.

In 1932 there was a widespread system of this type of school comprising every autonomous republic and region without exception. Thus, at the beginning of the Five-Year Plan period, Buryat-Mongolia had two technicums with 219 students, while in 1932 it had eight technicums with 1,395 students. Bashkiria which had 12 technicums in 1928 with 3,114 students, now has 42 technicums with 10,820 students. Kazakstan had 25 technicums with 3,750 students in 1928 and now has 98 technicums with 24,116 students, etc.

Altogether, there were 379 technicums with 85,344 students in the autonomous republics and regions of the R.S.F.S.R. in 1932.

In White Russia there were 30 technicums at the beginning of the Five-Year Plan period and today there are 107 of them; in Transcaucasia the number of technicums went up from 95 to 250; in Uzbekistan and Tadjikistan the total number of technicums increased from 42 to 107.

The rapid economic and cultural growth of the national minority republics and regions resulted in a rapid *increase of population* and the *formation of new modern cities.*

New cities have been created including Elista, the capital of the Kalmuck Republic; Mikoyan-Shakhav, the capital of the Karacha region; Igarka and Khibinogorsk lying within the Arctic Circle; Birobidjan; Novy Chardjui, the capital of Turkmenistan; Stalinabad, the capital of Tadjikistan, and a number of others.

Such are only some of the results of the cultural advance which has been achieved in the national minority republics and regions during the first Five-Year Plan period. Only the land of the proletarian dictatorship could have witnessed such a powerful growth of national culture, socialist in content and national in form, a culture based upon the rapid economic development of the national minority regions, upon the material, technical and cultural assistance rendered by the proletariat of the principal industrial centres of the country.

The possibility of backward national minority regions effecting the transition to socialism without passing through the stage of capitalism—a transition which is being achieved under the leadership and with the aid of the advanced industrial proletariat of the U.S.S.R., and to which Marx, Engels, Lenin and Stalin have all referred—has thus been practically demonstrated on the broadest historical scale.

APPENDIX

TABLES

APPENDIX

Table No. 1

POPULATION FIGURES

(In millions, at end of year)

	1913	1928	1932	1932 in % to 1928	1932 in % to 1913
1. Total population . . .	139.3	154.2	165.7	*107.5*	*119.0*
Of which:					
a) Urban . .	24.7	27.6	38.7	*140.2*	*156.7*
b) Rural . .	114.6	126.6	127.0	*100.3*	*110.8*
2. Percentage of urban population to total . .	*17.7*	*17.9*	*23.3*	—	—

Table No. 2

CHANGE IN COMPOSITION OF POPULATION
1928-32

(Average figure for year)

	1928	1932	1932 in % to 1928
1. Non-agricultural population (in millions)	32.4	47.4	*146.3*
Percentage to total population . .	*21.3*	*28.8*	—
2. Agricultural population, including those employed in forestry and fishing (in millions)	119.9	117.2	*98.2*
Percentage to total population . .	*78.7*	*71.2*	—
Collective farm population (in millions)	2.0	66.7	*3,330.0*
Percentage of collective farmers in rural non-proletarian population	*1.7*	*61.6*	—

Table No. 3

TOTAL CAPITAL INVESTMENTS IN NATIONAL ECONOMY

(In billions of rubles, in prices of the respective years)

Sectors of National Economy	During restoration period 1923-24 to 1927-28		Estimate for 5-yr. Plan (1928-29 to 1932-33)		Realized in $4^1/_4$ years		Investments in $4^1/_4$ yrs. in $^0/_0{}^0/_0$ to	
	Investments	Percentage	Investments	Percentage	Investments	Percentage	Estimate of 5-yr. Plan	Investments during restoration period
Total for National Economy as a whole	26.5	*100.0*	64.5	*100.0*	60.0	*100.0*	*93.0*	*226.4*
A. Socialized Sector	11.1	*41.9*	46.9	72.7	52.5	*87.5*	*111.9*	*473.0*
B. Private Sector	15.4	58.1	17.6	27.3	7.5	*12.5*	*42.6*	*48.7*

Table No. 4

CAPITAL INVESTMENTS IN SOCIALIZED SECTOR OF NATIONAL ECONOMY

(In billions of rubles, in prices of the respective years)

Branches of National Economy	During restoration period 1923-24 to 1927-28		Estimate for 5 years in 5-yr. Plan		Realized in $4^1/_4$ years		Investments in $4^1/_4$ yrs. in $^0/_0{}^0/_0$ to	
	Investments	Percentage	Investments	Percentage	Investments	Percentage	Estimate of 5-yr. Plan	Investment during restoration period
Total investments in socialized sector	11.1	*100.0*	46.9	*100.0*	52.5	*100.0*	*111.9*	*473.0*
Of which:								
1. Industry	4.9	*44.2*	19.1	*40.7*	24.8	*47.2*	*129.8*	*506.1*
Group "A"	3.6	*32.4*	14.7	*31.4*	21.3	*40.6*	*144.9*	*591.7*
2. Agriculture	0.7	*6.3*	7.2	*15.3*	10.8	*20.6*	*150.0*	*1,542.8*
3. Transport	2.7	*24.3*	9.9	*21.1*	9.8	*18.7*	*99.0*	*363.0*
4. Communication	0.1	*0.9*	0.3	*0.6*	0.56	*1.1*	*186.7*	*560.0*

Table No. 5

GROSS PRODUCTION OF CENSUS INDUSTRIES

(In billions of rubles, in prices of 1926-27)

Industries by Groups	1913	1928	1932	Planned for 1932-33 in 5-yr. Plan	1932 in %% to		
					1932-33 in 5-yr. Plan	1928	1913
All industries	10.25	15.7	34.3	36.6	*93.7*	*218.5*	*334.5*
Group "A"	4.29	7.0	18.0	17.4	*103.4*	*258.6*	*419.5*
Group "B"	5.96	8.7	16.3	19.2	*84.9*	*187.3*	*273.5*
Percentage of Group "A" to total	*41.8*	*44.3*	*52.5*	*47.5*	—	—	—
Percentage of Group "B" to total	*58.2*	55.7	*47.5*	*52.5*	—	—	—

Note: This table gives the indices of the increase in production in the four years of the Five-Year Plan period in comparison with the 1928 calendar year. Compared with the production during the 1927-28 fiscal year, the gross production of the census industries in 1932 amounted to 233.3%: for Group "A" industries, to 272.7% and for Group "B" to 201.2%. Compared to the estimate of production for the 1927-28 fiscal year in the Five-Year Plan the production of the census industries in 1932 amounted to 246.8.

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Table No. 6

CURVE OF GROSS PRODUCTION OF CENSUS INDUSTRIES DURING THE PERIOD OF THE FIVE-YEAR PLAN

(In billions of rubles, in prices of 1926-27)

Industries by groups	1928	1929	1930	1931	1932
All industries	15.7	19.8	25.2	30.9	34.3
Group "A"	7.0	9.0	12.7	16.0	18.0
Group "B"	8.7	10.8	12.5	14.9	16.3
Percentage of Group "A" to total	*44.3*	*45.5*	*50.4*	*51.8*	*52.5*
Percentage of Group "B" to total	*55.7*	*54.5*	*49.6*	*48.2*	*47.5*

Table No. 7

YEARLY RATE OF GROWTH OF THE GROSS PRODUCTION OF CENSUS INDUSTRIES

Industries by groups	In percentages to preceding year			
	1929	1930	1931	1932
All industries	126.1	127.3	122.6	111.0
Group "A"	129.3	141.1	126.0	112.5
Group "B"	124.1	115.7	119.2	109.4

Table No. 8

GROSS PRODUCTION OF THE PRINCIPAL BRANCHES OF INDUSTRY

(In millions of rubles, in prices of 1926-27)

Industries	1928	1932	Planned for 1932-33 in 5-yr. Plan	1932 to 1932-33 in 5-yr. Plan	1932 to 1928 (In percentages)
Fuel, total	1,079.0	2,382.9	2,387.0	*99.8*	*220.8*
Coal	375.2	659.9	740.0	*89.2*	*175.9*
Oil	582.7	1,413.0	1,309.0	*107.9*	*242.5*
Metal, total	2,722.6	9,032.6	7,100.0	*127.2*	*331.7*
Ferrous metals	705.5	1,263.7	1,869.0	*67.6*	*179.1*
General machine building, ship building and production of metal goods	1,405.8	5,252.9	2,899.0	*181.2*	*373.6*
Agricultural machine building	176.9	890.4	893.0	*99.7*	*503.3*
Electrical equipment	239.3	1,218.3	896.0	*136.0*	*509.1*
All machine building, including electrical equipment	1,822.0	7,361.6	4,688.0	*157.0*	*401.8*
Chemicals Group "A"	348.0	1,039.9	1,413.0	*73.6*	*298.8*
Timber	836.7	2,400.0	2,803.0	*85.6*	*286.8*
Industries producing articles of consumption (without food)	5,406.0	8,997.1	12,233.0	*73.5*	*166.4*
Food	1,544.5	3,485.3	3,325.9	*105.3*	*225.6*

Table No. 9

ELECTRIFICATION

	1913	1928	1932	Planned for 1932-33 in 5-yr. Plan	1932 in %% to		
					1932-33 in 5-yr. Plan	1928	1913
1. Capacity of all electric power stations in U.S.S.R. (in thous. kw. at end of year)[1]	1,098.0	1,874.4	4,567.0	5,500.0	*83.0*	*243.7*	*415.9*
Of which: capacity of district stations	170.0	610.0	2,624.7	3,200.0	*82.0*	*430.2*	*1,543.5*
Percentage of capacity of district stations to total	*15.5*	*32.5*	*57.5*	*58.2*	—	—	—
2. No. of hours of utilization of average yearly rated capacity of the district stations	—	3,610.0	3,570.0[2]	4,040.0	*88.4*	*98.9*	—

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[1] Exclusive of temporary stations at construction jobs.

[2] Without the Dnieper Electric Power Station—3,720 hours.

Table No. 10

PRIME MOVERS IN THE NATIONAL ECONOMY OF THE U.S.S.R.

	1913	1928	1932	1932 in %% to 1928	1932 in %% to 1913
1. Production of electric power by all stations of U.S.S.R. (in millions of kw.h.)	1,945.0	5,003.0	13,100.0	*261.8*	*673.5*
Of which: district stations	431.0	1,950.0	7,895.0	*404.9*	*1,831.9*
District station production in percentage to total	*22.2*	*38.9*	*60.3*	—	—
2. Coefficient of electrification of industrial production (percentage of electric power in total power consumed as motor power)	—	*50.9*	*71.2*	—	—
3. Total power supply per worker (in kw.h. consumed in industry per man-hour)	—	1.28	1.71	*133.6*	—
4. Electric power supply per worker (in kw.h. of electric power consumed in industry per man-hour)	—	0.68	1.28	*188.2*	—

Table No. 11

RATED CAPACITY OF ELECTRIC POWER STATIONS IN PRINCIPAL DISTRICTS IN THE U.S.S.R.[1]

Republics and Regions	Capacity of electric power stations at end of year (in thousand kw.)				1932 in %% to 1928 for all stations
	1928		1932		
	All stations	District stations	All stations	District stations	
Northern Territory	14.6	—	37.80	—	*259.0*
Karelian Republic	2.6	—	13.89	—	*534.2*
Leningrad Region	284.1	186.2	410.34	319.4	*144.4*
Western Region	35.6	—	77.44	22.0	*217.5*
Moscow Region	387.5	254.0	665.38	526.5	*171.7*
Ivanovo Region	101.8	8.0	253.98	111.0	*249.5*
Gorky Territory	46.4	20.0	225.39	158.0	*485.8*
Ural Region	131.1	6.0	434.00	252.0	*331.0*
Bashkir Republic	8.1	—	15.17	—	*187.3*
Tartar Republic	9.2	—	22.50	10.0	*244.7*
Middle Volga	18.3	—	40.37	15.2	*220.6*
Lower Volga	26.1	—	130.63	73.5	*502.5*
Northern Caucasus and Daghestan	74.0	—	210.81	122.0	*284.9*
Crimea	9.8	—	25.75	—	*262.7*
Kazakstan	5.1	—	15.26	—	*299.2*
Western Siberia	26.3	—	87.08	36.0	*366.2*
Eastern Siberia		—	9.60	—	
Ukrainian S.S.R.	465.2	20.0	1,428.92	792.5	*307.1*
White Russian S.S.R.	18.1	—	55.83	20.0	*308.4*
Transcaucasian F.S.S.R.	141.4	113.0	220.55	176.1	*156.0*

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[1] Exclusive of temporary electric power stations on construction jobs and also of the stations under the control of the Commissariats of Transport, Communication and Water Transport.

Table No. 12

RECONSTRUCTION OF INDIVIDUAL METAL WORKING INDUSTRIES IN THE U.S.S.R.[1]

Industry	Total metal cutting and metal pressing machines installed up to April 10, 1932	Including those installed (In %% to total for each industry)		
		Up to 1918	1918-28	During 3¹/₄ yrs. of 1st Five-Year Plan ('29, '30, '31 and 1st quarter of '32)
All metal working industries	113,431	33.4	22.4	44.2
Machine building	87,278	34.9	20.1	45.0
Boiler equipment	805	43.0	16.2	40.8
Electric power equipment	6,201	27.7	27.3	45.0
Precision machinery . .	5,451	4.8	27.5	67.7
Metal working machine-tools	4,305	16.9	13.8	69.3
Equipment for oil and mining industries . . .	2,336	26.5	34.0	39.5
Equipment for metallurgy	2,258	39.7	17.3	43.0
Equipment for food industry	1,680	33.5	25.4	41.1
Construction and road-making machinery . .	1,396	28.4	24.0	47.6
Machinery for structural iron	294	20.6	20.6	58.8
Agricultural machines and implements	10,276	23.2	21.3	55.5
Tractor industry	4,566	2.0	2.5	95.5
Automobile industry . .	6,775	6.2	8.3	85.5
River boats	892	29.2	20.4	50.4
Equipment for communication . .	4,442	42.1	26.2	31.7
Equipment for cultural supplies .	851	24.5	15.2	60.3
Metal wares	26,153	28.3	29.8	41.9
Machine parts	3,087	29.2	18.2	52.6
Instruments	7,025	30.3	26.9	42.8

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[1] According to data of equipment inventory of April 10, 1932.

Table No. 13

ELECTRIFICATION OF MACHINE-TOOLS OF METAL WORKING INDUSTRIES IN THE U.S.S.R.[1]

Industry	% of electrically driven metal cutting machine-tools with individual or group motor	% of metal cutting machine-tools with individual motor
All metal working industries	97.5	37.2
Machine building	97.9	40.4
Boiler equipment	88.5	29.7
Electric power equipment	99.5	89.6
Precision machinery	99.6	51.9
Metal working machine-tools	98.3	39.4
Equipment for oil and mining industries	99.1	40.2
Equipment for metallurgy	98.6	38.8
Equipment for food industry	90.0	30.5
Construction and road-making machinery	86.5	18.5
Machinery for structural iron	92.2	48.0
Agricultural machines and implements	98.1	37.2
Tractor industry	99.9	82.2
Automobile industry	99.0	82.0
River boats	100.0	27.0
Equipment for communication	99.9	44.4
Equipment for cultural supplies	99.0	54.6
Metal wares	95.7	25.0
Machine parts	97.8	40.2
Instruments	94.9	26.3

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[1] According to data of equipment inventory taken on April 10, 1932.

Table No. 14

BLAST FURNACES IN U.S.S.R., GROUPED ACCORDING TO VOLUME

At beginning and end of the Five-Year Plan period

Volume of furnaces	South		East		Central		Total	
	Oct. 1 1928	Jan. 1 1933	Oct. 1 1928	Jan. 1 1933	Oct. 1 1928	Jan. 1 1933	Oct. 1 1928	Jan. 1 1933
Up to 100 cu. m.	—	—	5	5	3	6	8	11
101-200 cu. m.	1	—	24	30	—	—	25	30
201-300 cu. m.	1	3	3	7	—	—	4	10
301-400 cu. m.	8	4	—	1	2	2	10	7
401-500 cu. m.	13	19	—	—	—	—	13	19
501-600 cu. m.	4	3	—	—	1	2	5	5
601-700 cu. m.	4	9	—	—	—	1	4	10
701-800 cu. m.	—	2	—	—	—	—	—	2
801-900 cu. m.	—	3	—	2	—	—	—	5
901-1000 cu. m.	—	1	—	—	—	—	—	1
Over 1000 cu. m.	—	—	—	2	—	—	—	2
Total	31	44	32	47	6	11	69	102

Table No. 15

OPEN HEARTH FURNACES IN U.S.S.R., GROUPED ACCORDING TO HEARTH AREA

At beginning and end of the Five-Year Plan period

Hearth area of furnaces	South		Central		East		Total	
	Oct. 1 1928	Jan. 1 1933	Oct. 1 1928	Jan. 1 1933	Oct. 1 1928	Jan. 1 1933	Oct. 1 1928	Jan. 1 1933
Up to 20 sq. m.	33	41	34	43	27	30	94	114
21-30 sq. m.	34	39	19	23	14	19	67	81
31-40 sq. m.	17	21	3	9	12	16	32	46
41-50 sq. m.	6	16	—	1	1	1	7	18
51-70 sq. m.	2	3	—	—	—	3	2	6
Total	92	120	56	76	54	69	202	265

Table No. 16

RECONSTRUCTION OF OIL INDUSTRY

	1913	1924-25	1927-28	1932		
				Amount	In percentage to	
					1913	1927-28
A. Total drilled (in thous. metres) .	277	182	362	743	*268.2*	*205.2*
By rotary drilling (in thous. m.) .	—	75	256	700	—	*273.4*
Percentage to total	—	*41.2*	*70.7*	*94.2*	—	—
B. Extracted petroleum (thous. tons)	9,235	6,986	11,542	21,381	*231.5*	*185.3*
By bailing (in thous. tons)	8,686	2,536	721	75	*0.9*	*10.4*
Percentage to total extracted . .	*94.1*	*36.3*	*6.3*	*0.3*	—	—
By deep pumping (in thous. tons)	106	1,188	3,882	4,766	*4,496.2*	*122.8*
Percentage to total extracted . .	*1.1*	*17.0*	*33.6*	*22.3*	—	—
By compressors (in thous. tons) .	—	1,220	2,140	10,964	—	*512.4*
Percentage to total extracted . .	—	*17.5*	*18.5*	*51.3*	—	—
From gushers (in thous. tons) . .	443	1.886	4,654	5,192	*1,172.0*	*111.6*
Percentage to total extracted . .	*4.8*	*27.0*	*40.3*	*24.3*	—	—
Length of main pipe lines to terminals (in km.)	1,217	1,217	1,764	3,074	252.6	*174.3*

Table No. 17 MECHANIZATION OF COAL PRODUCTION IN U.S.S.R. DURING PERIOD OF FIVE-YEAR PLAN

Coal Districts	Mechanized coal production				Mechanized production in 1932 in %% to 1927-28 production
	1927-28		1932		
	In thous. tons	%% to total production	In thous. tons	%% to total production	
In whole coal industry	5,537.8	*15.7*	40,061.7	*63.6*	*723.4*
1. Donbas	5,024.0	*18.4*	31,614.2	*71.9*	*629.3*
2. Moscow Basin	28.0	*2.4*	1,604.4	*56.5*	*5,730.0*
3. Far East	—	—	812.2	*40.9*	—
4. Urals	434.1	*22.3*	1,476.2	*47.4*	*340.2*
5. Kuzbas	44.5	*1.8*	3,188.4	*44.8*	*7,164.9*
6. Eastern Siberia . .	7.2	*0.8*	1,053.7	*48.3*	*14,634.7*
7. Central Asia . . .	—	—	312.6	*42.5*	—

Table No. 18 NUMBER OF MACHINES IN COAL INDUSTRY IN U.S.S.R., 1928 and 1932

	Heavy Cutting Machines			Pneumatic Pick Hammers		
	Oct. 1 1928	Dec. 1 1932	In %% to Oct. 1 1928	Oct. 1 1928	Dec. 1 1932	In %% to Oct. 1 1928
Donbas	530	1,304	*246.0*	60	5,220	*8,700.0*
Moscow Basin . .	6	27	*450.0*	11	598	*5,436.4*
Urals	13	55	*423.1*	—	321	—
Kuzbas	—	53	—	—	738	—
Eastern Siberia . .	1	25	*2,500.0*	—	—	—
Far East	—	—	—	—	445	—
Central Asia . . .	—	6	—	—	54	—
Total for U.S.S.R.	550	1,470	*267.3*	71	7,376	*10,388.7*

Table No. 19

RAILWAY TRANSPORT

	1913	1928	1932	Planned for 1932-33 in 5-year Plan	1932 in %% to		
					1932-33 in 5-yr. Plan	1928	1913
A. Operation length of railway lines, in thous. km.	58.5	76.9	83.4	94.0	*88.7*	*108.5*	*142.6*
B. Freight traffic							
Freight carried, in billion t./km.	65.7	93.4	169.3	162.7	*104.1*	*141.3*	*257.7*
Density of traffic per km. of operation length of railway lines, in thous. t./km.	1,123.0	1,213.0	2,030.0	1,730.0	*117.3*	*167.3*	*180.8*
C. Passenger traffic							
Total passengers carried, in bill. psgr./km.	25.2	24.5	84.1	35.4	*237.6*	*343.3*	*333.7*
Density of traffic per km. of operation length of railway lines in thous. psgr./km. . .	432.0	320.0	1,008.0	402.0	*250.7*	*315.0*	*133.9*
D. Total load carried in t./km.	90.9	117.8	253.4	198.1	*127.9*	*315.1*	*178.8*

Table No. 20

SOWN AREA IN U.S.S.R.

(In million hectares)

	1913	1928			1932		
	Total area sown	Total area sown	Sown by		Total area sown	Sown by	
			State farms	Collective farms		State farms	Collective farms
Total sown area (for all crops)	105.00	112.99	1.74	1.37	134.43	13.5	91.57
Under all grain crops . .	94.36	92.17	1.10	1.04	99.71	9.30	69.12
Under wheat	31.65	27.73	0.35	0.45	34.63	4.51	26.98
Under industrial crops	4.55	8.62	0.32	0.16	14.88	0.97	11.35
Cotton	0.69	0.97	0.02	0.02	2.17	0.15	1.43
Long fibre flax	—	1.36	0.01	0.01	2.51	0.05	1.59
Sugar beet (for refining)	0.65	0.77	0.20	0.01	1.54	0.20	1.11

Table No. 21

INCREASE OF SOWN AREA AND THE SHARE OF THE STATE AND COLLECTIVE FARMS IN THE TOTAL SOWN AREA

	Percentage of area sown in 1932 to that sown in		Share in %% of area sown by State and collective farms			
			1928		1932	
	1913	1928	State farms	Collective farms	State farms	Collective farms
Total sown area (for all crops) . .	128.0	119.0	1.5	1.2	10.0	68.1
1. Total grain area	105.7	108.2	1.2	1.1	9.3	69.3
Wheat	109.4	124.9	1.3	1.6	12.7	77.9
2. Industrial crops	327.0	172.6	3.7	1.9	6.5	76.3
Cotton	314.5	223.7	1.5	1.8	6.9	65.8
Long fibre flax	—	184.6	0.3	0.7	2.0	63.3
Sugar beet (for refining)	236.9	200.0	26.0	1.6	13.0	72.1

Table No. 22

MAIN INDICES OF STATE FARM CONSTRUCTION DURING PERIOD 1928-32

	1928	1932	1932 in percentage to 1928
A. Total number of State farms . .	3,125	10,203	*326.4*
Of which:			
Large trustified State farms . . .	—	4,523	—
B. Sown area (in thous. hectares) .	1,735	13,557	*781.3*
C. Livestock in large State farms (at end of year, in thous. head)			
1. Total large horned cattle . . .	180	2,100	*1,166.7*
Of which: Cows	60	1,150	*1,916.7*
2. Sheep and goats	747	4,400	*589.0*
3. Hogs	30	950	*3,166.7*
D. Power equipment			
1. Number of tractors[1]	6,719	72,960	—
2. Capacity of tractors (in thous. h.p.)	77.6	1,353	—
% of mechanized traction	*51.7*	67	—
E. Average yearly number of workers (in thousands)	345.4	1,046.6[2]	592.5

[1] The number of tractors for 1928 is given as of October 1.

[2] The average yearly number of workers for 1932 is based on the preliminary estimate of the Labour Sector of the Central Board of National Economic Accounting.

Table No. 23

MAIN INDICES OF COLLECTIVE FARM CONSTRUCTION

	1928	1932	1932 to 1928 (in percentage)
A. Collective Farms			
1. Number of collective farms (in thous.)	33.3	209.6	*629.4*
2. Number of former individual farms in them (in thous.)	416.7	14,707.7	*3,529.4*
3. Percentage of collectivized farms	*1.7*	*61.5*	—
4. Sown area (in thous. hectares)	1,370	91,579	*6,684.5*
5. Per cent to total area sown by peasants	*1.2*	*75.6*	—
B. Machine and Tractor Stations			
1. Number of MTS	None	2,115 [1]	—
2. Served by the MTS (in thous.) .			
Collective farms	”	71.8 [1]	—
Former individual farms in them	”	6,826.0	—
3. Percentage of those served by MTS to total			
Collective Farms	—	*34.3* [1]	—
Former individual farms in them	—	*45.4*	—
4. Area sown by collective farms served by MTS (in thous. hectares)	—	50,686	—
Percentage to total area sown by all collective farms	—	*55.3*	—
C. Tractor Supply of Collective Farms and MTS			
1. Number of tractors	10,854 [2]	98,207 [3]	*904.8*
2. Capacity (in thous. of h.p.) . .	108.9	1,272.9	*1,168.8*
D. Machine Hay Mowing Stations			
1. Number of HMS	None	417	—
2. Number of collective farms served by HMS	”	7,725	—
3. Area harvested by HMS (in thous. hectares)	—	6,684	—
4. Percentage to total hay harvested area	—	*15.2*	—
5. Percentage to hay harvested area of collective farms	—	*20.0*	—

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[1] As of July 1, 1932.

[2] As of September 1, 1928, in collective farms.

[3] As of January 1, 1933.

Table No. 24

LABOUR

	1928	1932	Planned for 1932-33 in Five-Year Plan	1932 in %% to	
				1932-33 as planned for in 5-yr. Plan	1928
A. Total number of workers and employees yearly average—in thous.	11,599.0	22,804.3	15,763.7	*144.7*	*196.6*
1. In industry as a whole . „	3,534.0	6,781.1	4,602.7	*147.3*	*191.9*
Including census industries . . . . „	3,126.0	6,411.1	4,080.1	*157.1*	*201.9*
2. In transport and communication . . . . „	1,365.0	2,383.0	1,544.7	*154.3*	*174.6*
Including those in railway transport . . . . „	971.0	1,468.1	1,007.2	*145.8*	*151.2*
3. In construction . . . . . . „	723.0	3,125.8	1,882.5	*166.0*	*432.3*
4. In social and cultural institutions . . . . „	1,188.0	2,004.1	1,549.8	*129.3*	*168.7*
Including those in educational institutions . . . „	789.0	1,349.6	1,031.1	*130.9*	*171.1*
5. In agriculture and forestry . . . . „	2,007.0	3,905.1	2,867.0	*136.2*	*194.6*
Including those in MTS and State farms . . . . . „	345.4	2,280.6	—	—	*660.3*

B. Average yearly wages of workers and employees (in national economy as a whole)	(in rubles)	703.4	1,432.4	994.0	*144.1*	*203.6*
1. In industry as a whole .	"	843.1	1,470.1	1,187.0	*123.9*	*174.4*
Including those in census industries	"	870.0	1,478.4	1,231.0	*120.1*	*169.7*
2. In transport and communication	"	855.0	1,483.7	1,160.0	*127.9*	*173.5*
Including those in railway transport	"	859.0	1,500.8	1,189.0	*126.2*	*174.7*
3. In construction	"	996.0	1,544.9	1,334.0	*115.8*	*155.1*
4. In social and cultural institutions	"	665.0	1,492.9	1,042.0	*143.3*	*224.5*
Including those in educational institutions . .	"	678.0	1,630.0	1,108.0	*147.4*	*240.4*
5. In agriculture and forestry	"	305.9	957.9	415.0	*230.8*	*313.1*
Including those in MTS and State farms	"	327.4	902.8	—	—	*275.7*
C. Total wage earnings of workers and employees (in million rubles) . . .		8,158.8	32,667.3	15,675.9	208.4	*400.4*

Table No. 25

MUNICIPAL SERVICES — OPERATION INDICES

(Totals for all U.S.S.R.)

I. Tram Service

Number of cities with tram service		Number of tramcars as per inventory			Length of track (single)			Passenger traffic (in millions)			Number of journeys per inhabitant		
1928	1932	1928	1932	% inc.	1928	1932	% inc.	1928	1932	% inc.	1928	1932	% inc.
39	50	4,800	7,795	*162.4*	2,120	2,700	*136.6*	1,640	5,200	356.0	164	320	*195.1*

II. Autobus Service

Number of cities with bus service		Number of autobuses as per inventory			Number of passengers carried (in millions)		
1928	1932	1928	1932	% increase	1928	1932	% increase
40	117	466	1,455	*312.2*	119.5	305	*257.1*

III. Water Supply Systems

Number of cities with water supply		Length of water conduits (in kilometres)			Number of buildings served (in thousands)			Amount supplied during year (in million cu. m.)		
1928	1932	1928	1932	% inc.	1928	1932	% inc.	1928	1932	% inc.
293	306	8,288.3	10,570.0	*127.2*	128.521	182.643	*142.1*	296.5	585.0	*197.3*

IV. Sewer Systems

Number of cities with sewer system		Length of systems (in kilometres)			Number of buildings served (in thousands)		
1928	1932	1928	1932	% inc.	1928	1932	% inc.
35	55	1,831.8	2,596.0	*141.8*	32.5	52.0	*160.0*

Table No. 26

MAIN INDICES SHOWING THE DEVELOPMENT OF PUBLIC CATERING, 1928-1932

(The systems of Centrosoyuz and People's Commissariat of Supply)

	1928	1929	1930	1931	1932	1932 to 1928 in %%	1932 in % to plan of 1932-33
Number of workers and employees served by public catering in the urban sector (in thousands; at end of year)	750	1,500	5,600	11,000	14,800	*1,973.3*	*643.5*
Output of public catering system in the urban sector (in thousands of dishes per day; end of year)	2,200	4,500	16,000	23,000	29,000	*1,318.2*	527.3
Turnover of public catering system in town and village (in million rubles in prices of corresponding year)	102	207	800	2,200	4,385	*4,299.0*	—
Capital investments in public catering system; Centrosoyuz and People's Commissariat of Supply (in million rubles)[1]	No data	8.5	29.5	37.0	75.0	—	—

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[1] Capital investments shown in the tables do not include investments made by the three industrial People's Commissariats in connection with public catering. These investments, made from the funds assigned for improving the living conditions of the workers in industry, amounted to no less than 150 million rubles during the Five-Year Plan period.

Table No. 27.

HEALTH PROTECTION

	1928	1932	1932 in percentage to 1928
1. Number of beds in hospitals and medical institutions in U.S.S.R. per 10,000 inhabitants	20.89	32.26	*154.4*
a) At service of urban population	76.50	93.30	*122.0*
b) At service of rural population	8.85	14.12	*159.5*
2. Average village population per one medical district	17,912.0	11,360.0	—
3. Total number of physicians	63,500.0	76,000.0	*129.7*

Data for beds include those in hospitals, sanatoriums, psychiatric institutions, on railways, etc.

Table No. 28

UNIFIED FINANCIAL PLAN OF FIRST FIVE-YEAR PLAN AND ITS REALIZATION

(In billion rubles)

	1928-29		1932		Realized in 4¼ years		Five-Year Plan provision for 5 years		Realization in 4¼ yrs. in %% to provision in 5-yr. Plan
	Amount	In %% to total	Amount	In %% to total	Amount	In %% to total	Amount	In %% to total	
A. Revenues									
I. Income of socialized economy	9.6	73.8	35.8	80.3	89.9	74.9	70.9	77.4	126.8
Of which: Industry	4.3	33.5	18.6	41.6	43.4	36.1	33.5	36.6	129.6
II. Mobilized resources of population	2.3	17.7	8.2	18.4	21.5	17.9	17.3	18.9	121.4
Of which: a) obligatory payments	1.0	7.7	3.0	6.5	7.5	6.2	6.8	7.4	108.8
b) voluntary payments	1.3	10.0	5.2	11.9	14.0	11.7	10.5	11.5	133.3
III. Other income	1.1	8.5	0.6	1.3	8.7	7.2	3.4	3.7	255.9
Total Revenue	13.0	100.0	44.6	100.0	120.1	100.0	91.6	100.0	131.1
B. Expenditure									
I. Financing national economy	7.2	55.4	30.2	67.8	80.3	66.8	56.8	62.0	141.4
Of which: 1. Industry	3.2	24.7	16.6	37.2	41.6	34.6	22.0	24.0	189.1
2. Agriculture	1.2	9.6	5.0	11.2	15.1	12.6	7.3	8.0	206.8
3. Transport and communication	1.4	11.1	4.9	10.9	12.5	10.4	10.2	11.1	122.5
II. Financing social and cultural construction	3.0	23.0	9.5	21.2	23.9[1]	20.0	21.4	23.4	111.7
Of which: 1. Education	1.4	11.0	5.7	12.1	14.1	11.7	10.4	11.4	135.6
2. Health protection	0.6	5.0	2.0	4.7	5.1	4.2	4.7	5.1	108.5
III. Administration and defence	1.6	12.3	2.5	5.6	9.0	7.5	10.0	10.9	90.0
IV. Other expenditures	1.2	9.3	2.4	5.4	6.9	5.7	3.4	3.7	202.9
Total Expenditures	13.0	100.0	44.6	100.0	120.1	100.0	91.6	100.0	131.1

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[1] The expenditures on cultural requirements do not include the expenditures of economic organizations on capital construction for social and cultural needs, amounting to (in million rubles):

1928-29	151.0
1932	790.5
4¼ years	2,080.9

Table No. 29

UNIFIED STATE BUDGET DURING FIRST FIVE-YEAR PLAN PERIOD

(In billion rubles)

INDICES	1927-28		1932		Planned for 1932-33 by Five-Year Plan		Percentage of 1932 to		Realized in 4¾ years	
	Amount	in %% to total	Amount	in %% to total	Amount	in %% to total	1932-33 as per Plan	1927-28	Amount	in %% to total
A. Revenues										
I. From socialized economy	3.93	75.4	25.20	82.6	8.97	75.9	280.9	641.2	60.07	82.6
Of which: Industry	2.43	46.6	16.07	52.7	5.68	48.1	282.9	661.3	38.78	53.3
II. From direct payments of population	0.91	17.5	4.65	15.3	2.18	18.4	213.3	511.0	10.37	14.2
Of which: State loans	0.50	9.6	2.78	9.1	1.27	10.7	218.9	556.0	6.25	8.6
III. Miscellaneous	0.37	7.1	0.64	2.1	0.67	5.7	95.5	173.0	2.32	3.2
Total Revenues	5.21	100.0	30.49	100.0	11.82	100.0	257.6	585.0	72.76	100.0
B. Expenditure										
I. Financing national economy	2.41	47.7	22.81	75.7	5.85	49.5	389.9	946.5	50.24	69.8
Including:										
a) Industry (exclusive of food)	0.66	13.0	11.87	39.4	1.67	14.1	710.8	1,798.5	22.99	32.0
b) Agriculture	0.26	5.1	3.62	12.0	0.93	7.9	389.2	1,392.2	8.54	11.9
c) Transport and communication	0.97	19.2	3.85	12.8	2.13	18.0	180.8	396.9	10.42	14.5

II. Financing social and cultural construction	0.41	*8.1*	1.79	*5.9*	1.08	*9.1*	*165.7*	*497.2*	4.61	*6.4*
Including:										
a) *Education*	0.31	*6.1*	1.63	*5.4*	0.85	*7.2*	*191.8*	*603.7*	4.12	*5.7*
b) Health protection	0.05	*1.0*	0.09	*0.3*	0.10	*0.8*	*90.0*	*225.0*	0.27	*0.4*
III. Administration and defence	1.20	*23.7*	1.84	*6.1*	1.63	*13.8*	*112.9*	*153.3*	6.95	*9.7*
IV. Miscellaneous	1.04	*20.5*	3.72	*12.3*	3.26	*27.6*	*114.1*	*341.3*	10.16	*14.1*
Of which: Funds transferred to local budgets	0.68	*13.4*	1.54	*5.1*	2.29	*19.4*	*67.2*	*226.5*	5.33	*7.4*
Total Expenditures	5.06	*100.0*	30.16	*100.0*	11.82	*100.0*	255.2	*596.0*	71.96	*100.0*

Notes: To render comparable the State budget as fulfilled in 1932 with the budget of 1927-28 and the Five-Year Plan budget for 1932-33, the revenues and expenditures in the budget for all years as given in the table *exclude:* a) the operating expenses of transport and communication from the expenditure and the corresponding sums from their revenue side; b) the taxes from the private sector from the revenues of the budgets and the corresponding reductions in the funds transferred to the local budgets from the expenditure.

The revenues of the State budget as given in the table do not include the balance left upon the fulfilment of the budgets of the preceding years and the expenditures do not include the excess of the revenues over the expenditure.

Table No. 30

FINANCING OF SOCIAL AND CULTURAL SERVICES DURING FIRST FIVE-YEAR PLAN PERIOD

(In million rubles)

	1927-28 Amount	1932		Planned for 1932-33 by Five-Year Plan		1932 in %% to 1932-33 as per Plan	Planned for 5 yrs. by Five-Year Plan	Realized in 4¼ years	Realization in %% to Plan
		Amount	in %% to 1927-28	Amount	in %% to 1927-28				
Total Expenditures	2,445	10,242	*418.9*	6,379	*260.9*	*160.6*	22,796	26,027	*114.2*
Of which:									
1. Education	1,063	6,411	*603.1*	3,349	*315.1*	*191.4*	11,290	15,413	*136.5*
2. Health protection	648	2,106	*325.0*	1,382	*213.3*	*152.4*	5,205	5,376	*103.3*
3. Social welfare and labour protection	734	1,725	*235.0*	1,648	*224.5*	*104.7*	6,301	5,238	*83.1*
Sources of Appropriation									
1. State budget	414	1,791	*432.6*	1,198	*289.4*	*149.5*	4,190	4,603	*109.9*
2. Local budgets	850	2,967	*349.1*	2,157	*253.8*	*137.6*	7,641	8,320	*108.9*
3. Social insurance	921	2,692	*292.3*	1,923	*208.8*	*140.0*	7,215	7,063	*97.9*
Of which: Medical aid fund	358	927	*258.9*	446	*124.6*	*207.8*	1,770	2,130	*120.3*
4. Socialized wage fund	—	—	—	449	—	—	1,130	—	—
5. Contributions of economic organizations	—[1]	791	—	—[1]	—	—	—[1]	2,081	—
6. Miscellaneous	260	2,001[2]	*769.6*	652	*250.8*	*306.9*	2,620	3,960[2]	*151.1*
Total from all sources	2,445	10,242	*418.9*	6,379	*260.9*	*160.6*	22,796	26,027	*114.2*

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[1] Expenditures of economic organizations on capital construction for cultural services in 1927-28, in the provisions of the Five-Year Plan for 1932-33 and in the Five-Year Plan as a whole, were covered by appropriations in the State budget.

[2] This sum includes contributions from the following sources (in million rubles):

	1932	For 4¼ years
Total Miscellaneous	2,001	3,960
Including:		
a) Contributions of economic organizations for training cadres, amounting to 4 per cent of the pay rolls	652	1,204
b) Contributions of trade unions	571	1,248
c) Contributions of co-operative organizations	234	627

Table No. 31

CADRES

	1914	1927-28	1932	Planned for 1932-33 by Five-Year Plan	1932 in percentage to		
					1932-33 as per Five-Year Plan	1927-28	1914
I. Number of students in higher and specialized schools at end of year:							
1. In higher technical schools, universities and academies (in thous.)	124.7	160.0	501.3	196.0	255.7	*313.3*	*402.0*
2. In secondary technical schools (in thous.)	267.0	253.6	949.2	327.0	*290.2*	*374.8*	*796.4*
3. In factory schools (in thous.)		178.3	1,177.3	430.0	*273.8*	*660.4*	
4. In workers' colleges (in thous.)	—	49.2	444.4	72.0	*617.2*	*903.3*	—
II. Number of specialists with completed higher and secondary technical education:							
1. Engaged in the productive spheres of national economy (in thous.)	—	146.0	375.0	—	—	*256.8*	—
2. Teachers (in thous.)	—	211.5	387.2	—	—	*183.1*	—
3. In medical service (in thous.)	—	135.5	211.0	—	—	*155.7*	—
III. Specialists in industry (graduate engineers and technicians and those with practical training; per 100 workers)	—	3.8	6.9	—	—	*181.6*	—

Table No. 32

EDUCATION

	1914	1927-28	1932	1932 in percentage to	
				1927-28	1914
A. Literacy level (percentage of population between ages of 8 and 50 years)					
General	—	58.4	90.0	—	—
Urban	—	78.5	97.0	—	—
Rural	—	48.3	88.0	—	—
B. Number of pupils in elementary and secondary schools (in thous.) .	7,800.0	11,279.0	23,113.0	*204.9*	*296.3*
Of which:					
Elementary schools (in thous.)	7,235.0	9,870.0	18,754.0	*190.0*	257.4
Secondary schools (in thous.)	565.0	1,409.0	4,359.0	*309.3*	*771.5*
Children of 8 to 11 years in elementary schools, in percentage to total	—	*51.4*	*98.0*	—	—
C. School buildings (in millions of cu. m.) . . .	—	91.3	143.2	*156.8*	—
D. Children in pre-school institutions (in thous.) .	—	308.0	5,232.0	*1,698.7*	—
Percentage of children of three to seven years in pre-school institutions .	—	*1.6*	*23.7*	—	—